The Fishes

of the

Swedish South Polar Expedition.

By

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With 5 plates.

The Ichthyological collections of this Expedition are very rich and very valuable in spite of the fact that a considerable part of the same was lost when the ship "Antarctic" foundered the 12th of Febr. 1903 after it had been crushed by the ice. This must be the more deplored as the lost material was collected in several localities of great interest, among which may be mentioned the cold basin of Bransfield Strait, where the bottom temperature was found to be — 1,65° C., the Gerlache Canal etc. Nevertheless, although the result with regard to the widening of the knowledge about the Antarctic Ichthys is not so great as it, with a little better luck, could have been, very important facts have been gathered concerning the geographical distribution of different species of fish, and quite a number of species and subspecies are in the following pages described as new to science. This, on the whole and under the prevailing circumstances gratifying, result is chiefly due to the assiduous efforts and energy of the Zoologist of the Expedition, Mr. K. A. ANDERSSON, who has caught nearly all of the fishes himself. It is a great pleasure to me to publicly acknowledge this here and tender him my best thanks for his valuable work and for the information concerning the capture of the different specimens etc. which he has given me. I wish also to give my compliments to Mr. C. SKOTTSBERG, the Botanist of the Expedition, who from living specimens has skilfully prepared the coloured figures which accompany this paper. Thanks to this, the reader has the pleasure of getting a fair idea of the beautiful colours of some of the antarctic fishes. The figures on the second plate are of special interest, because the original specimens to them belonged to the material which was lost in the shipwreck.

The collection comprises as well shore fishes as pelagic, resp. benthopelagic, fishes. The latter will be described in a separate chapter. The former again are collected at many different stations as well in the subantarctic as within the true Antarctic Region. The localities group themselves, however, naturally round certain geographical areas, viz. Tierra del Fuego with Staaten Island and surrounding seas, the Falklands with the Burdwood Bank, South Georgia, and finally the South Shetlands-Graham Land complex of islands and lands. I have therefore found it most suitable to treat the fishes of these areas separately, the more so as, as will be shown in the following, these areas from a zoogeographical point of view, to a certain degree, form units. By this I mean that the fishes of one such area are not all of them wholly identical with those of another area, but at least some of them represented by similar fishes which in certain instances, although in many respects corresponding, are specifically different, in others only subspecifically, or racially. This difference is a natural result of isolation, because the shore fishes of one district have been prohibited by wide interjacent areas of deep water to interbreed with their congeners in another district. This can, of course, only hold good for such fishes which have demersal eggs, and which, at no period of their life, lead a pelagic life. Although the development and life-history of the *Nototheniidæ* are very imperfectly known, it might be assumed per analogiam from what we know about arctic fishes, that shore fishes living in such a cold climate, as most of the Nototheniidæ do, hardly can have a pelagic development. In certain instances the comparatively large size of the eggs indicate that they are demersal. It also happens, especially among the members of this family, that geographical species, resp. subspecies, have been developed and substitute each other within different districts.

When the differences between the representative species are very great and the characteristics easily seen no systematist would hesitate to describe each under a separate name. When the distinguishing characteristics between the fishes of one region and those of another are less sharply marked and less numerous, the opinion of different ichthyologists might perhaps take different expressions. Some might create new species, others might unite several forms under one and the same name. It is the old case "splitter" versus "lumper". It seems to me that both extremes should be avoided. When two fishes from two different localities are essentially alike and exhibit the same type, so to say, but at the same time differ through some perhaps small, but always constant characteristics, they may be regarded as belonging to one and the same species, but as being subspecifically distinct, and to express this, three names may be used, as rather extensively has already been done in the masthological and ornithological literature, but comparatively little in the ichthyological. In such a way the unity as well as the diversity has been duly recognized, as they ought to be. When describing the present material I have

tried to apply these principles, because I think that the systematical knowledge is best served in this way. Unfortunately there remains nevertheless some uncertainty concerning which characteristics may be regarded as being of specific or only of subspecific value and in some cases this must be almost a matter of personal taste or conviction. But even with this weakness the use of a ternary nomenclature, when needed, appears to be better than an indiscriminate "splitting" or "lumping". It is better than the "splitting", because it permits a subordination of unequal notions which with this latter method is impossible when only specific names are used, so that two or more forms, which are nearly related and perhaps only varieties (geographical or not) of one and the same, must appear to stand quite as much apart from each other as in reality sharply defined and isolated species do. The "lumping" is still more apt to bring confusion in the system, when it tends to throw together two or more forms which have only superficial likeness and perhaps in reality are only distantly or not at all related. For the study of zoogeography the recognition of subspecies is a great help, because it, at once, viz. already in the names, gives information as well about which forms belong together, as about which, through isolation or other causes, have become differentiated from a common type, thus as well about major as minor zoogeographical districts.

When the present author promised (p. 2) to describe in a separate chapter the fishes collected by this Expedition in the true Antarctic Region it is evident that he understands with the "Antarctic Region" something else than Dr. L. DOLLO, who in his learned treatise on the fishes of the Expedition of "Belgica" * appears to count to this region only the interior of the Antarctic Polar Circle although he admits himself that this only is a provisorical arrangement. I cannot agree with Dr. DOLLO in circumscribing the Antarctic Region, taken in a biological sense, in such a purely mathematical way. The life-zones do not and cannot coincide with the mathematical divisions of the earth, because the physical conditions, on which the former are utterly dependent, do not directly and only in a remote degree correspond with the mathematical divisions. A glance at a map, on which the isotherms have been laid out, suffices to show this. The experience from the Arctic Region proves also in the most eminent manner that the Arctic Circle has nothing to do with the Arctic life-zone which for instance, on the european side, is pushed back far above the Polar Circle, but, on the american side, extends far to the south of the same, a fact so well known by all biologists that it need no further explication. It is also known that the climatological conditions, which cause this, in their turn are due to the great sea currents which on the eastern side of the Atlantic move great masses of warm sea water towards the north and on the western side in a

* Résultats du Voyage du S. Y. Belgica. Rapports Scientifiques. Zoologie. Poissons par L. Dollo. Anvers 1904.

corresponding manner masses of cold water and ice towards the south. In a similar way an interchange of cold and warm water must take place in the south polar region, and this gives an undulating boundary line to the true Antarctic Region, a boundary line that cannot coincide with the Antarctic Polar Circle nor with any other mathematical circle. Although the antarctic seas are not by far so well explored, neither hydrographically nor in other respects, as the arctic. This has been proved by the simple fact that it has been so much easier to progress towards the south in some parts of the globe than in others. The boundary line of the Antarctic life-zone cannot with the present state of our knowledge be laid out all around the globe, but this does not matter so much for the present memoir which only deals with fishes from the Atlantico-American quadrant. But within that same a trial must be made to define to a certain degree the northern limit of the Antarctic life-zone. When making this we have to consider the terrestrial as well as the marine conditions. The latter are not so well known as yet as they will be when the hydrographical material of this Expedition has been worked out and lies ready before the scientific public. But some, and, as I think, for this purpose sufficient facts, might already be gathered. A sea where the temperature in the summer from the surface to the bottom in a depth of 1450 m. shows a temperature below zero of the centigrade deserves to be termed "Antarctic". Such was the case in Bransfield Strait at the end of Nov. 1903. The temperature at the surface was — 1,50° C. and at the bottom — 1,65° C.* It is true that in an intermediate depth the temperature rose somewhat, even slightly above zero, viz. + 0,02° C. in a depth of 300 m. from the surface, but this does not materially alter the pronounced fact that Bransfield Strait is truly and purely antarctic and Dr. J. G. ANDERSSON calls it in his narrative "the coldest marine area on the globe" (l. c. p. 167). The southern coasts of the South Shetland Islands are thus bordered by this cold sea and the sounds between them as well as their northern coasts are, for all we know, in the summer surrounded by drifting pack ice, at least some years, and must therefore be termed antarctic. The same holds good for the Joinville Island. The cold basin of Bransfield Strait extends rather far east, but even beyond its eastern limit at 61 52′ S. lat. 52 57′ W. long. the bottom temperature in a depth of 1,631 m. was found to be — 0,4° C., a temperature low enough to be called antarctic. That the Erebus and Terror Gulf is truly antarctic as to its physical conditions may not be disputed when it has been stated that it even in summer, at least some years, is to a great extent covered by an unbroken sheet of sea ice. All this may be summed up to the statement that the seas surrounding the South Shetland Islands, Joinville Island, Louis Philippe Land and the land and the islands to the south of these are truly antarctic even if situated north of the Antarctic Polar circle.

* J. G. ANDERSSON: »Antarctic», två år bland sydpolens isar. Stockholm 1904. II p. 166.

The terrestrial conditions of this region do not speak against this. The land is to a great extent all the year covered with ice and snow. From a botanical point of view Mr. C. SKOTTSBERG refers to the Antarctic Zone: "Graham Land with its subdivisions -- — — and surrounding groups of islands — — —, and the South Shetland islands, the Elephant islands and the South Orkney islands." * The terrestrial flora of the ground, which is "frozen almost all the year", consists almost exclusively of sparse mosses and lichens, and the sea has no algæ with floating fronds. The organic life as well as the physical conditions prove thus that the true Antarctic region in a biological sense in the parts of the globe visited by this Expedition extends rather far above the Antarctic Polar circle and at least to 61° S. lat.

But on the other hand the inhabitants of Arctic resp. Antarctic life-zones are not entirely confined to the Arctic resp. Antarctic region because no biological limits are sharply drawn. Arctic shore fishes are found far south of the arctic region and the reader will find further below that a number of the fishes regarded by DOLLO (l. c.) as truly antarctic have been found even considerably north of the boundary-line just proposed, although the same is made more northern than the one he has proposed himself.

The history of the antarctic and subantarctic ichthyology is so extensively and fully treated in the work just published by DOLLO and which has been quoted above so that I can refer to this rather than to repeat what has so recently been laid before the scientific world.

Before I conclude this introductory chapter and pass over to the treatment of the special subject I wish to express my great gratitude to Mr. G. A. BOULENGER F. R. S. etc. and Professor Dr. AUG. BRAUER. The former has kindly compared some *Notothenioidæ* with specimens in British Museum and the latter, who has made the *Myctophidæ* the object of a thorough study, has kindly given me his opinion about some members of this family.

* C. SKOTTSBERG: On the zonal distribution of South Atlantic and Antarctic Vegetation. The Geographical Journal. Dec. 1904.

The fishes of Tierra del Fuego, Staaten Island and adjacent seas.

The collection from this district comprises only 12 species, but there are some novelties among these, viz. a new species of *Notothenia*, a geographic subspecies of *Murænolepis marmoratus* GÜNTHER and a young *Macrurus* which perhaps is new, but which I do not want to name on account of the scantiness of the material. Whether representing a new species or not, it is certainly new to the locality. The other species are all of them recorded from the Magellan district before.

An interesting collection from Tekenika Bay was among the lost treasures.

1. **Notothenia tessellata** RICHARDSON.

Numerous specimens from Ushuaia caught in a depth of 10 m.

2 small specimens from Ushuaia caught in the same depth 12th of March 1902.

Concerning the colour of the latter is communicated the following on the label: "White with irregular dark spots on the back and the sides."

2. **Notothenia coriiceps** RICHARDSON.

1 specimen from stat. 14 Ushuaia, Tierra del Fuego, depth 10 m. gravel and stones with algæ, 19th of March 1902.

1 specimen from stat. 13 Ushuaia, Tierra del Fuego, depth 8 m. stones and gravel with algæ, 13th of March 1902.

About the colour of the last mentioned specimen is recorded on the label: "Speckled with dark all over except on the white belly, vertical fins dark with white bands, paired fins white with reddish bands."

3. **Notothenia brevicauda** n. sp.

(Pl. V. Fig. 16.)

1 specimen from Ushuaia, depth 10 m. 15th of March 1902.

D. V. 35. A. 32. Squ. 66.

Head moderately compressed, extensively scaly all over except on snout to above nostrils and preorbital. Body rather strongly compressed. Depth of body $4^4/_5$ times in total length without caudal. Length of head $3^1/_2$ times in total length without caudal. Diameter of eye 4 times in length of head. Interorbital width

about 7 times in length of head. Snout a little longer than diameter of eye. Upper lateral line with 45—46 tubular scales, lower lateral line only with 5—6 tubular scales, but in front of them may be counted a great number of pitted scales, on one side 20. First dorsal basally somewhat connected with second. Longest ray of former shorter than longest ray of latter which is equal to half the length of the head. Longest anal rays about $^1/_3$ of length of head. Pectoral rounded about $^2/_3$ of length of head, reaching beyond origin of anal. Ventral about $^5/_7$ length of head, reaching beyond origin of anal. Caudal very strongly rounded. Caudal peduncle much deeper than long, so short that as well anal as especially second dorsal when laid back reach beyond the same, its depth not even contained twice in length of head. Anal and ventral fins as well as gill-membrane dusky.

It is not agreeable to create a species of *Notothenia* on a single specimen, but it cannot be avoided in this case. *N. brevicauda* is very easily distinguished from other species of this genus. In its general shape it perhaps resembles most *N. coriiceps* RICHARDSON of such as I have seen myself, but differs widely from the same in having occipital and interorbital regions as well as opercles and cheeks densely scaly, a narrower interorbital region and much deeper caudal peduncle. Similar characteristics distinguish *N. brevicauda* from *N. cyanobrancha* RICHARDSON although the latter has scales on the cheeks but not on the interorbital and occipital regions. *N. karlandreæ* (described below) has also some exterior resemblance to this fish, but has a much smaller number of scales (about 46) and rays in second dorsal (28—30) and anal (28) as well as a much more slender caudal peduncle, etc. *N. tessellata* RICHARDSON has a greater number of rays in first dorsal, smaller scales, narrower caudal peduncle. The slenderness of the caudal peduncle is also a sharply distinguishing characteristic when *N. brevipes* (described below), *N. longipes* STEINDACHNER, and *N. marionensis* GÜNTHER are compared with this fish so that hardly any others are needed, although such exist, viz. in different numbers of scales and fin rays, length of ventrals, shape of caudal, etc. *N. elegans* GÜNTHER and *N. nicolai* BOULENGER are recognized by their naked interorbital region etc The remaining species of the genus differ still more so that they need not to be compared with this one. The following exact measurements shew the dimensions of the single specimen.

Total length without caudal	120 mm.
Greatest depth of body	25 »
Depth of caudal peduncle	13
Length of head	34
Interorbital width	4.8 »
Diameter of eye	8.5 »
Length of snout	10 »
Length of ventral	25 »

4. **Pseudaphritis gobio** (GÜNTHER).

1 specimen from stat. 60, lat. 55° 10′ S.; long. 66° 15′ W., depth 125 m., coarse gravel and shells, temperature + 4,3 C. 15th of Sept. 1902.

About the colour is remarked on the label: "Yellowish brown with reddish brown and darker blotches, iris emerald green."

This specimen has numerous cutaneous appendages which at first appeared to the collector — as has been recorded by members of other expeditions before — to be parasitic Crustacea.

5. **Harpagifer bispinis** (FORSTER).

Several small specimens from stat. 3 between Staaten- and New Year Islands (E. of Tierra del Fuego), depth 36 m., small stones and gravel. 6th of Jan. 1902.

All these specimens are provided with three broad, but irregular, transverse dark bands.

6. **Phucocoetes variegatus** (GÜNTHER).

2 specimens, depth 10 m., Ushuaia. 15th of March 1902.

7. **Ilucocoetes fimbriatus** JENYNS var.

1 specimen from stat. 60, lat. 55° 10′ S.; long. 66° 15′ W., depth 125 m., coarse gravel and shells, temperature + 4,3 C. 15th of Sept. 1902.

Although this specimen is small only measuring 60 mm. in length it agrees in most respects with the descriptions of this species so that I think I may refer it to the same. The colour is said to have been "pale yellow with brownish violet spots, a broad band of the latter colour across the head fading laterally but with sharp contours anteriorly (just in front of the eyes) and posteriorly (on the occiput)".

A comparison between this specimen and another *Ilucocoetes* from the Falklands is made at another place in this paper. It ought, however, to be observed here that the eye of this specimen is small compared with the descriptions of *I. fimbriatus* JENYNS being only one fifth of the length of head, four fifths of the interorbital breadth. The pectoral is also short, not much more than half as long as the head.

8. **Maynea patagonica** CUNNINGHAM.

1 specimen from stat. 60, lat. 55° 10′ S.; long. 66° 15′ W., depth 125 m., coarse gravel and shells, temperature + 4,3° C. 15th of Sept. 1902.

About the colours is stated on the label: "Upper half of iris brownish yellow, lower half white, everywhere bright; pinkish with 15 transverse bands composed of brownish violet spots."

9. **Murænolepis marmoratus** GÜNTHER n. subsp. **microps**.

1 specimen from stat. 60, lat. 55° 10′ S.; long. 66° 15′ W., depth 125 m., coarse gravel and shells, temperature + 4,3° C. 15th of Sept. 1902.

Although this specimen is small, only measuring 85 mm. in total length, it has the same relative dimensions between length and depth of body as the adult fishes and thus differs from the fish named *Murænolepis orangiensis* by VAILLANT. *

Concerning the colour the label informs us: "Belly silvery, sides of body pale lilac with fine brown dots."

About the relation of this fish to the types of *Murænolepis marmoratus* GÜNTHER is reported in the chapter about the fishes from South Georgia (p. 43).

10. **Genypterus blacodes** (FORSTER).

(Pl. II Fig. 8.)

1 specimen from stat. 76, Tekenika Bay, southern part of Tierra del Fuego, depth 7 m., mud and masses of *Rhodymenia*, 6th of Nov. 1902.

This specimen was lost at the ship-wreck, but fortunately Mr. SKOTTSBERG had prepared a coloured figure of it while still living, and this was saved and is now reproduced here (Pl. II fig. 8). The identification is based on this figure which I have compared with descriptions and specimens.

The species has been recorded before from Staaten Island.

11. **Macrurus** sp. (conf. **holotrachys** GÜNTHER).

1 small specimen from stat. 62, Beagle Channel, Tierra del Fuego, depth 140 m., mixed clay and sand. 16th of Sept. 1902.

Snout moderately produced, shorter than eye which is contained 2½ times in length of head. Interorbital breadth 5/6 of vertical diameter of eye. Anterior edge of snout with three low angles which are roughened by spines, especially the middle one from which a low keel extends backwards to the interorbital region. Mouth inferior, angle of the same below the middle of the eye. Each scale with five series of spinelets, slightly diverging. On the back the middle one of these is much the

* Mission Scientif. d. Cap Horn. Poiss. 1888.

strongest so that the continuous longitudinal lines formed by them are especially there prominent. Upper and lateral parts of head covered by irregular keeled and rough scales. The infraorbital ridge, which is continuous to the posterior corner of the preopercle, fringed with spinelets as the tip of snout. Lower side of head naked. Four scales anteriorly between the dorsal spine and the lateral line otherwise only three between the latter and the dorsal fin. Teeth of the mandible in a narrow band formed by a few series. Distance between isthmus and vent equal to length of head without snout. Barbel a little shorter than diameter of pupil. Distance between both dorsals shorter than base of first dorsal. Second dorsal spine with five well developed barbs on its dorsal half, on the proximal there are only two very minute and inconspicuous spinelets. Outer ventral ray produced. Tail very slender with some long rays at the tip. About 7—8 dusky and not sharply defined transverse bands, darker than the ground-colour. Peritoneum black shining through the body-wall.

Total length including caudal	88 mm.
Length of head	nearly 18 »
Longitudinal diameter of eye	7 »
Vertical » »	6 »
Length of snout	5.5 »
Interorbital width	5 »

This fish is evidently nearly allied to *Macrurus holotrachys* * GÜNTHER and it might perhaps be a young specimen of the same, although there are several discrepancies. Some of these may be attributed to the difference in size and age between this specimen and GÜNTHER's type from the Challenger-Expedition. The former measures in total length, including the caudal, only 88 mm., the latter (9 inches or) about 228 mm. In the present specimen the snout is shorter than the eye, instead of equal to the same, but this is readily interpreted as a juvenile characteristic. It is more difficult to explain the differences in the armature of the scales which in *M. holotrachys* are said to have only "two or more isolated spinelets" in addition to the median series. The latter has also 5 scales in a transverse series between the dorsal spine and the lateral line and perhaps a somewhat greater distance between both dorsal fins. The presence of darker transverse bands may be understood as a juvenile characteristic disappearing with age.

The great likeness in the shape and armature of the snout and the infraorbital ridge, the small number of scales between the dorsal fin and the lateral line, the characteristic resemblance with regard to the distance of the vent from the isthmus compared with the length of head without snout appear to be most convincing concerning the identity of this specimen with *M. holotrachys*. I do not wish, however

* Scientific Results of the Voyage of H. M. S. Challenger. Zoology XXII. Deep-Sea Fishes, p. 136.

to make this identification because I have only one specimen which is quite young. The name *M. holotrachys* was also given and the diagnose based on a single specimen so that the possible variation of the species has not been ascertained. The specimen described by GÜNTHER was found "East of the mouth of Rio de la Plata" in a depth of 600 fathoms by the Challenger Expedition.

12. **Myxine australis** JENYNS.

Several specimens from Ushuaia, depth 30 m., shells and gravel. 20th of March 1902.

The conditions of this locality proves that *M. australis* is less exclusively confined to muddy bottom.

At, and in the mouth of, a fresh water rivulet emptying into Tekenika Bay, Tierra del Fuego, partly in brackish, but partly also in fresh water, a kind of large fishes were caught in a fair number by seining. The water was so shallow that the members of the fishing party could manage the small seine wading in the water with top boots. From 10 to 80 fishes could be caught at one time and as they were rather large, 60 to 70 cm. in average, this kind of fishing caused a great excitement among the crew. It was certainly also a lively scene to see the great fishes and the sailors splashing in the shallow water. The people residing at Tekenika Bay, and two falklanders hired as sailors termed these fishes "mullet", but they were certainly no members of the genus *Mugil* as they had a long dorsal fin. Their colour was light greyish above shading into whitish or silvery below. Mr. ANDERSSON thought that they resembled, to some extent, a *Merluccius*, but the specimens preserved were lost, among so many other valuable collections, with the sinking vessel. It is not easy to express any opinion about them now, but just because the zoologist of the expedition was sure about their identification when the preserved material had been carried home, as he certainly hoped it should be, he made no further examination of, or notes about them as his time was much occupied with such a great number of other things.

A similar fishing was also done at Port Albemarle, Falkland Islands, although not quite so successfully.

Fishes from the Falklands and the Burdwood Bank.

This collection comprises 14 species. Among them there are two very well defined new species of the genus *Notothenia*. Another species of *Notothenia* is found new to the district, so is also *Maynea* and a *Liparis* which might prove to be entirely new. An *Ilucocoetes* appears to differ from specimens collected at Tierra del Fuego. According to DOLLO's valuable extracts [1] from the literature the fauna of the Falklands contained 21 species. This number is by this collection increased to at least 26. The additions which are not entirely new to science were before known from the Magellan territory, with which the Falklands also otherwise closely agree with regard to its Ichthys.

BOULENGER has not long ago described from the Falklands a fish *Phucocoetes flavus* [2] not found elsewhere and therefore probably endemic at these coasts. The discovery of some more fishes about which a similar supposition can be made is of interest, and points out the long isolation of the Falklands from the biological centre of the Magellan Archipelago, or the southern end of the South American continent.

1. **Notothenia sima** RICHARDSON.

(Pl. I Fig. 1.)

Numerous specimens from stat. 40, Berkeley Sound, Falklands, depth 16 m., gravel, shells and algæ, temperature + 2,75 C. 19th of July 1902.

Numerous specimens from stat. 41, Port Louis, Falklands, depth 2—4 m., gravel and mud. 23d of July 1902.

1 specimen from stat. 43, Port Louis, Falklands, depth 3 m., stones and algæ. 28th of July 1902.

Numerous specimens from stat. 44, Port Louis, Falklands, depth 7 m., mixed mud and stones with vegetation of algæ. 28th of July 1902.

Numerous specimens from stat. 45, Port Louis, Falklands, depth 4 m., stones and algæ. 6th of Aug. 1902.

2 specimens from stat. 46, the creek on the northern side of Port Louis, Falklands, depth 1 m., fine sand covered by a dense growth of *Codium*. 3d of Aug. 1902.

[1] l. c. p. 167—168.

[2] Ann. Mag. Nat. Hist. Vol. VI 1900.

1 specimen from stat. 47, Port Louis, Falklands, depth 3—4 m., shells and stones. 9th of Aug. 1902.

4 specimens from stat. 48, Berkeley Sound, Falklands, depth 25 m., sand and stones, temperature + 2,75° C. 10th of Aug. 1902.

Numerous specimens from stat. 50, Port Louis, Falklands, depth 7 m., mud. 12th of Aug. 1902.

1 specimen from stat. 52, Port Williams, Falklands, depth 17 m., sand. 3d of Sept. 1902.

3 specimens from stat. 53, Port Williams, Falklands, depth 12 m., sand and gravel. 3d of Sept. 1902.

2 specimens from stat. 54, Port Stanley, Falklands, depth 10 m., mud and shells. 3d of Sept. 1902.

The specimens of this fish which live among algæ are much more variegated than those from other localities and sometimes very beautifully coloured as the sketch made by Dr. C. SKOTTSBERG at stat. 40 from a living specimen shows us (Pl. I fig. 1).

The specimens from stat. 48, 50 and 52 have more sombre and uniform colours in consequence of the different conditions of the bottom.

2. **Notothenia coriiceps** RICHARDSON.

2 specimens from Greenpatch, Port Louis, Falklands, caught under stones at low tide. 27th of July 1902.

3 specimens from the same place as above, found among roots of kelp entangled in long-lines, depth 7 m. 27th of July 1902.

Numerous specimens from the northern shore of Port Louis, Falklands, under stones at low tide. 6th of Aug. 1902.

Numerous specimens from the same locality, collected the following day.

1 specimen from stat. 39, Port Williams, Falklands, depth 40 m., sand and small stones with algæ. 4th of July 1902.

2 specimens from stat. 43, Port Louis, Falklands, depth 3 m., stones with algæ. 28th of July 1902.

3 specimens from stat. 53, Port Williams, Falklands, depth 12 m., sand and gravel. 3d of Sept. 1902.

This fish is a very pronounced shore-fish chiefly living in the tide-region, only one specimen being caught in so deep water as 40 m. This one was more light-coloured than the others.

3. **Notothenia karlandreæ** * n. sp.

(Pl. IV fig. 13.)

2 specimens from stat. 53, Port Williams, Falklands, depth 12 m., sand and gravel. 3d of Sept. 1902.

3 specimens from stat. 54, Port Stanley, Falklands, depth 10 m., mud and shells. 3d of Sept. 1902.

D. VI, 28—30. A. 28—29. Sq. about 46.

Head broad, rather strongly depressed, its width being $^3/_4$ of its length, the latter contained about $3^1/_3$ times in total length without caudal. Anterior portion of body depressed, posterior compressed, its depth about 5 to $5^1/_2$ times in total length without caudal. Diameter of eye a little more than 4 times in length of head in adult specimens, only $3^1/_3$ times in small specimens. Snout broad, rounded, equal to diameter of eye in young specimens, a little longer in the adult. Interorbital width $6^1/_2$ to 7 times in length of head. Maxillary extending to below anterior third or fourth of eye. Lower jaw not projecting. Scales on body rather large, ctenoid, on head smaller and weaker, but covering opercles, occipital region and posterior part of interorbital space (in young specimens the scales of the head are still less developed). Lower side of head, preorbital and snout to behind nostrils and anterior part of interorbital space naked. Second dorsal rather high, its longest rays about $^2/_3$ of length of head. Pectorals rounded about $^3/_4$ length of head, ventrals a little shorter reaching to vent or beyond. Pectorals reaching to about fourth anal ray. Caudal strongly rounded. Fins to great extent black, especially ventrals, but also anal in all specimens quite black. Dorsal and caudal sooty with light margin and the latter also with small light round spots (in spirit). Caudal peduncle much deeper than long, its depth being contained about 3 times in length of head.

This fish appears to be related to *Notothenia marionensis* GÜNTHER, but the scales of the head are by far not so strongly developed in the former as in the latter, at least if the South Georgia race of it is similar to the typical one from Marion Island. The interorbital space of *N. marionensis* is much narrower and its ventrals shorter not reaching the vent. Its head is narrower being about $^2/_3$ of its length and the snout is more pointed. The intensely black fins of the new species seem also to present a very good characteristic. The race of *N. marionensis* from South Georgia has a much more slender caudal peduncle which is longer than deep and with its depth less than a fourth of the length of head. The same fish has also the caudal less strongly rounded than this new species.

Notothenia sima which has a similar number of fin rays and scales as *N. karlandreæ* differs from the same in having a less depressed and narrower head with

* Named for the zoologist of the Expedition K. A. ANDERSSON Esq.

the whole interorbital region strongly scaly, a less rounded more truncate caudal, not pigmented ventral and anal fins etc. The whole exterior of these two species is much more dissimilar than the short characteristics indicate.

4. **Notothenia longipes** STEINDACHNER.

4 specimens from stat. 53, Port Williams, Falklands, depth 12 m., sand and gravel.

2 specimens from stat. 54, Port Stanley, Falklands, depth 10 m., mud and shells. 3d of Sept. 1902.

2 specimens from stat. 57, Port Albemarle, Falklands, depth 18—30 m., sand. 11th of Sept. 1902.

All these specimens are young but may be recognized by their large eyes, narrow interorbital space and long ventrals when compared with *Notothenia tessellata*. *N. longipes* appears to be new to the Falklands. It is described from the Magellan territory and the West-Patagonian archipelago. But if *N. squamifrons* GÜNTHER from Kerguelen Land is entirely identical with *N. longipes* STEINDACHNER as BOULENGER has stated * it must have a very wide distribution in subantarctic seas.

5. **Notothenia brevipes** n. sp.

Numerous specimens from stat. 39, Port Williams, Falklands, depth 40 m., sand and small stones with algæ. 4th of July 1902.

3 specimens from stat. 48, Berkeley Sound, Falklands, depth 25 m., sand and stones, temperature + 2,75° C. 10th of Aug. 1902.

1 specimen from stat. 49, the same locality, depth 25—30 m., shells and stones 10th of Aug. 1902.

4 specimens from stat. 51, Port Williams, Falklands, depth 22 m., sand. 3d of Sept. 1902.

Numerous specimens from stat. 52, the same locality, depth 17 m., sand. 3d of Sept. 1902.

1 specimen from stat. 54, Port Stanley, Falklands, depth 10 m., mud and shells. 3d of Sept. 1902.

1 specimen from stat. 57, Port Albemarle, Falklands, depth 18—30 m., sand. 11th of Sept. 1902.

D. (VI) VII, 32, A. (29) 30—32. Sq. about 76—78.

Head depressed, flattened above, body fusiform, compressed posteriorly. Depth of body 5 to 6 times in total length. Length of head 3 to 3 1/2 times in total length

* Rep. on Coll. "Southern Cross". Pisces. London 1902.

without caudal. Its width at preopercles about $^2/_3$ of its length. Interorbital width 7 to nearly 8 times in length of head. Diameter of eye about 4 (in young $3^3/_4$) times in length of head. Snout about equal to eye, in young specimens a little shorter, in old, perhaps, a little longer. Cheeks, opercles, occipital and interorbital regions scaly, snout and preorbital naked. Posterior end of maxillary reaching to below anterior third of eye. Gill-rakers comparatively long, 14 on lower part of anterior arch. Caudal peduncle deeper than long, its depth being contained about 4 times in length of head. Pectorals rounded, a little shorter than head, extending a good deal beyond origin of anal. Ventrals short not reaching vent, half as long as head in adult specimens, $^3/_5$ or even a little more in young specimens, rhomboidal or somewhat elliptic in shape but always blunt at the tip. First dorsal usually with 7 spines but the hindmost is often very small. Caudal truncate rounded above and below, its length is about $^3/_5$ of the length of head. Scales rather small but not densely set, very little imbricate, usually about 77 in a longitudinal series above the upper lateral line. The scales are not sharp to the touch nor are any spinelets visible on most scales under the magnifying lens so that they cannot be called ctenoid but pseudocycloid. Upper lateral line with about 42 to 46 tubular scales, lower lateral line with 3 to 10 tubular scales behind and in front of them a shorter or longer series of pitted scales. Irregular dark spots on the sides form 5—6 cross bands which may be divided each in 2 or 3 spots. Second dorsal with oblique longitudinal narrow bands of small dark spots on the rays.

From *Notothenia tessellata* RICHARDSON and allies this species differs through its narrow interorbital region and different scales. From *N. longipes* it differs through the shortness of the ventral fins and the absence of ctenoid spinelets on most scales. *N. brevipes* has also, as a rule, one spine more in the first dorsal than maximum in *N. longipes*, but several 3 to 5 rays less in second dorsal than minimum in *N. longipes*.

6. **Pseudaphritis gobio** (GÜNTHER).

1 specimen from stat. 59, lat. 53 45′ S.; long. 61° 10′ W. (Burdwood Bank), depth 137—150 m., shells, gravel and stones, temperature at a depth of 130 m. + 3,20 C. 12th of September 1902.

The locality recorded above is, as it seems, the most south-eastern at which this fish hitherto has been found, but I cannot see any remarkable difference between the present specimen and such from other localities. It is, however, rather small not measuring more than about 6 cm. in total length. The species is recorded by GÜNTHER from the Falklands and the fauna of the Burdwood Bank is no doubt to a great extent the same as that of the Falklands.

7. **Harpagifer bispinis** (FORSTER).

Several specimens collected at the northern shore of Port Louis, Falklands, under stones at low tide. 7th of August 1902.

1 small specimen from stat. 52, Port Williams, Falklands, depth 22 m., sand. 3d of September 1902.

The largest specimen measures 80 mm. in total length, which appears to be an unusually large size for this species.

8. **Liparis antarctica** PUTNAM n. subsp. (?) **falklandica**.

(Pl. III Fig. 12.)

1 specimen from stat. 40, Berkley Sound, Falklands, depth 16 m., gravel, shells and algæ, temperature + 2,75 C. 19th of July 1902.

1 specimen from stat. 59, lat. 53° 45′ S.; long. 61° 10′ W. (Burdwood Bank), depth 137—150 m., gravel, shells, algæ, temperature in a depth of 130 m. + 3,20° C. 12th of September 1902.

These fishes agree pretty nearly with *Liparis antarctica* PUTNAM, according to GARMAN's description,* but there is one very important discrepancy with regard to the nostrils. GARMAN says about the species quoted (l. c. p. 61): "Anterior nostril tubular, near the eye; posterior above the eye, on the interorbital space." In these specimens a tubular nostril is found in front of the eye at a distance equalling half a diameter of the latter. There is no trace of any nostril in the interorbital space. A pair of smaller openings in front of the nostrils and with a more median situation than the same, represent only mucuous pores, and they have the same appearance as these pores on the upper lip. If, as I think, this interpretation is right the posterior nostrils have become completely closed. The proportions of the head are almost similar to those of *L. antarctica*, it is namely as thick as long, if the opercular flap is not counted, and this dimension is contained a little more than $3^1/_3$ times in total length without caudal, with the opercular flap the length of the head is contained $3^1/_2$ times in total length with caudal. Interorbital breadth twice in length of head. Eye small, if only the black clearly visible part of the same is measured its diameter is contained about thrice in interorbital width and about six times in length of head. The pupil is in one specimen contracted to a small horizontal slit, in the other dilated and round. The snout is thick and considerably protruding beyond the mouth. Length of snout is contained about $2^1/_2$ times in length of head. Distance from end of the snout to origin of anal equal to distance from the latter point and to

* The Discoboli. Mem. Mus. Comp. Zool. Vol. XIV No. 2 Cambridge Mass. 1892.

the middle of the caudal. The transversal diameter of the disk about equal to interorbital width. Dorsal and anal fins rather high so that their vertical height at the middle of the anal fin equals $^3/_4$ of the height of the body at that place. They are continuous with the caudal along half its length. Number of anal rays about 25. In the dorsal about 25 rays can be counted, but in front it narrows to a low keel, which probably contains 3 or 4 more short rays which cannot be counted, in consequence of the thickness of the skin. Pectoral with 29 rays on one, 30 on the other side; about 8 rays protrude enough to be called a fringe on the sides of the disk. Vent close to posterior margin of the disk and in a distance from the origin of the anal which fully equals the transversal diameter of the disk $1^1/_2$ times.

On the lower lip and extending on the opercle, there is on either side a series of 6 pores; on the upper lip, almost on its lower surface, there are on either side 4, on either side of the snout 1, and a little higher up, half way to the nostril, but with a more median situation, again 1 on either side. This latter pair is the one mentioned above. Teeth very minute tricuspid with broadly spreading, truncate cusps (see fig. 12). Vent near the posterior margin of the ventral disk.

Both specimens milky white, the larger with some cloudy dusky spots on head and upper part of the sides.

The exact measurements of the larger and better preserved specimen are as follows:

Total length with caudal	74 mm.
» » without »	64 »
Depth of body	20 »
Length of head without opercular flap	19 »
Entire length of head	21 »
Thickness » »	19 »
Interorbital space	10 »
Diameter of eye	3,5 »
Length of snout	8 »
Transversal diameter of disk	9,5 »

The dimensions of the eye compared with those of the snout and the interorbital space of this specimen agree better with GARMAN's figures than with his description. The relation between the length of the body in front of the anal origin and that behind the same of the present specimen and GARMAN's quoted figures is almost identical. The height of dorsal and anal fins is considerably greater in the present specimen than it appears to be in GARMAN's figure, in which, for instance, the vertical height of the anal at its middle is equal to only half the height of the body at that place. The difference in this respect may perhaps be due to different age as GARMAN's specimen appears to have been only half as large as the greater of the present specimens. The less protruding snout of the latter may also be due

to the same cause and perhaps the absence of the posterior nostril may be attributed to the same, as well. But then it is to be remembered that the smaller of the present specimens, which is only about 45 mm., exhibits the same characteristics and therefore I thought it most suitable to distinguish these specimens as belonging to a separate subspecies, especially as there are still some more differences. The vent has a more posterior situation in GARMAN's figures and the dorsal reaches further forward.

The type-locality of *Liparis antarctica* PUTNAM is Eden Harbour in the southern part of South America.

Liparis Steineni described by FISCHER [1] from South Georgia differs from the present form by its much greater number of fin rays (d. 44—45; a. 36), more posterior situation of the vent etc.

The fish called by VAILLANT *Enantioliparis pallidus* [2] from Orange Bay, Tierra del Fuego, is also different. It is longer, so that its length of head is contained 4 times in total length, interorbital width is more than half the length of head, diameter of eye contained 5 times, snout nearly 3 times in length of head. The pectorals have only 20 rays. The vent is, according to the figure, situated much nearer the anal fin than the ventral disk etc.

The variety of *Liparis* from the Falklands has accordingly no close relationship to any other southern form of this genus but *L. antarctica.*

Before this no *Liparis* has been recorded from the shores of the Falklands or surrounding seas.

9. **Phucocoetes latitans** JENYNS.

2 specimens found below stones at low tide at the northern side of Port Louis, Falklands, 6th of Aug. 1902.

The length of the specimens is about 10—11 cm. They are dark all over except a small spot on the occiput and the usual marks on the lips and opercle, along the upper margin of the dorsal, and at the end of the pectorals and tip of tail.

10. **Phucocoetes variegatus** (GÜNTHER).

(Pl. I Fig. 5.)

2 specimens found among roots of kelp thrown up on the beach by a storm, at Greenpatch, Port Louis, Falklands, 30th of July 1902.

[1] Jahrb. wiss. Anstalt. Hamburg 1884. Hamburg 1885.
[2] Miss. Sci. Cap Horn, Poiss. 1888.

1 quite small specimen from stat. 42, Port Louis, Falklands, depth 8 m., mud and shells. 26th of July 1902.

1 specimen from stat. 52, Port Williams, Falklands, depth 17 m., sand. 3d of Sept. 1902.

1 specimen from stat. 53, Port Williams, Falklands, depth 12 m., sand and gravel. 3d of Sept. 1902.

All these species belong to the variety termed "*micropus*" by SMITT.[1] The smallest specimen (from stat. 42) measured only 25 mm. and was pictured, when still alive, by Dr. SKOTTSBERG (Pl. I fig. 5).

Both these species of *Phucocoetes* have been described from the Falklands before.

11. **Maynea patagonica** CUNNINGHAM.

1 specimen from stat. 53, Port Williams, Falklands, depth 12 m., sand and gravel, 3d of Sept. 1902. A young specimen labelled "greyish white with 12 brown transverse bands".

This species appears to be new to the Falklands, its hitherto known distribution being more western.

From the coast of Chile STEINDACHNER has described[2] transversally banded specimens of this species collected by PLATE and such a pattern may be the common (among the young?), although the type was uniform.

12. **Ilucocoetes fimbriatus** JENYNS n. subsp. **fasciatus.**

1 specimen among roots of kelp hauled up from a depth of 7 m., Greenpatch, Port Louis, Falklands. 27th of July 1902.

The genus *Ilucocoetes* appears to be imperfectly known and it contains, no doubt, more than one species although hitherto only the specific name *fimbriatus* originally given by JENYNS has been used. This specimen from the Falklands has a rather striking colouration being dark brown with 5—6 more or less developed whitish transverse bars. For fishes living among algæ such a colouration must be of protective value, but at the same time transversely banded forms are numerous among the *Lycodidæ*, especially when they are young, so that such a pattern must consequently represent at the same time an ancestral characteristic in that family. It

[1] Bihang. K. Vet. Akad. Handl. Bd. 24 N:o 5 p. 43. Stockholm 1898.

[2] Fauna Chilensis. Zool. Jahrb. Suppl. IV Hft. 2, 1898.

therefore might sometimes appear as an atavistic feature, and for that reason such a characteristic cannot suffice to distinguish two species or subspecies of *Iucocoetes*, but taken together with others it is of importance. And it is in this case not only different colouration but differences with regard to the relative dimensions as well, by which the present specimen is to be distinguished from *Iucocoetes fimbriatus*, as it is described in the literature, and from a specimen obtained by this expedition at Tierra del Fuego, stat. 60 as well. The description of the present specimen is as follows.

Length of head fully 5 times in total length. Depth of body about three fourths of the length of head and more than 7 times in total length. Snout longer than the diameter of the eye (about $^8/_5$ of the latter). Eye and interorbital space about equal, contained about $5^3/_5$ times in length of head. The maxillary seems to extend to below the middle of the eye. A rather broad cutaneous flap at the corner of the mouth, two more between the same and the nasal tube, and a median one between both nasal tubes. Below the lower jaw three cutaneous appendages alternate with large mucous pores on either side. Both upper and lower lips are "fleshy" and folded. The dorsal begins in front of the extremity of the opercle. Pectoral contained about $1^3/_4$ times in length of head. Distance from base of pectoral to vent about $1^1/_3$ as long as head. Ventrals short, contained about 7 times in head or 4 times in pectoral.

From this is apparent that this form differs from the typical *I. fimbriatus* through its longer snout and smaller eye, shorter ventrals and especially by the much greater distance between base of pectoral and vent. The typical *I. fimbriatus* is also said to be of a uniform colouration.

STEINDACHNER has used the same name for a fish from eastern Tierra del Fuego collected by PLATE,* but the relative dimensions etc. of that fish differ so much from the corresponding ones recorded for *I. fimbriatus* that it seems rather uncertain whether the identification is correct. On the other hand it must be admitted that STEINDACHNER's specimen is rather large, measuring about 252 mm. and it is not known in this genus, how the relative dimensions are altered during the growth. STEINDACHNER's specimen has a much smaller head and eye and this may be due to greater age.

The differences between this transversely banded *Iucocoetes* and the specimen from Tierra del Fuego collected by this same expedition cannot be explained as depending upon different age as both are young and nearly of the same size. The following table of comparative measurements may therefore prove the existence of more than one form of *Iucocoetes*.

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* Die Fische der Sammlung Plate, Fauna Chilensis, Hft 2 Zool. Jahrb. Suppl. 1898.

	Transversely banded specimen from the Falklands.	Yellow specimen from Tierra del Fuego.
Total length	74 mm.	60 mm.
Length of head in % of total length	18,9 %	18,3 %
Greatest depth of body	13,5 »	11,6 »
Depth of body at the origin of anal fin	10,8 »	10,0 »
Distance from snout to origin of anal fin	44,5 »	39,1 »
Distance from origin of anal fin to tip of tail	55,4 »	58,3 »
Distance from base of pectoral to vent	27,0 »	20,0 »
Length of pectoral	10,8 »	10,0 »
Length of snout	5,4 »	4,5 »
Diameter of eye	3,3 »	3,3 »
Interorbital breadth	3,3 »	4,1 »

Although the relative dimensions of head and eye of these two specimens are the same, those of interorbital breadth and length of snout differ. The relation between the preanal and postanal portions of the body are also strikingly different and so is the relation between the distance between pectoral and vent compared with the total length. Provided now that my opinion is correct, when I regard the specimen from Tierra del Fuego as the true *Ilucococtes fimbriatus* JENYNS, the specimen from the Falklands must be, at least, a distinct subspecies.

13. **Haplochiton zebra** JENYNS.

7 specimens from freshwater at Mount Pleasant, Falklands, collected and presented to the Expedition by Mr. JOHN KIRWAN.

This fish is known to the falklanders under the name "trout", which seems rather suitable as it is an antarctic substitute for this fish, or perhaps better still for the harr of the arctic or subarctic region. *Haplochiton* and *Salmo alpinus* live under similar conditions of life and it is of very great interest to find that this has resulted in producing at the opposite ends of the globe two fishes of almost identical shape and with relative dimensions which are strikingly similar. To enlighten this I append here the measurements of a couple of specimens of *Haplochiton zebra* from the Falklands and put at their side the corresponding measurements of three specimens of *Salmo alpinus* from Northern Sweden and Lapland. The latter measurements have been taken from the late Professor F. A. SMITT's work * "Kritisk förteckning öfver de i Riksmuseum befintliga Salmonider".

* K. Vet. Akad. Handl. Bd. 21 N:o 8. Stockholm 1886

	Haplochiton zebra.		*Salmo alpinus.*		
Total length from snout to end of the middle rays of caudal	236	248	225	291	293
Length of head . . . . . in % of total length	18,2	19,7	19,6	20,3	18,1
» » snout . . . . . » » » »	5,8	6,5	5,3	6,3	5,1
Interorbital width . . . . . » » » » »	6,7	6,9	5,7	6,1	6,1
Length of maxillary . . . . . » » » » »	7,2	7,7	6,8	6,8	6,8
» » mandible . . . . . » » » » »	8,4	9,0	11,5	12,0	10,9
Distance from snout to origin of dorsal . . . . . » » »	51,7	52,4	42,7	40,5	41,6
Length of base of dorsal . . . . . » » »	11,0	11,3	10,2	10,0	10,6
Height of dorsal . . . . . » » » » »	11,0	12,1	12,4	13,1	10,6
Length of pectoral . . . . . » » » »	11,4	13,4	14,7	16,5	13,7
Distance from base of pectoral to base of ventral » » » »	28,4	29,7	28,9	27,8	27,6
» » snout to base of ventral . . . . . » » » »	44,9	49,2	45,8	47,4	44,7
Length of ventral . . . . . » » » »	11,4	12,1	11,3	11,7	10,2
Distance from base of ventral to origin of anal . . » » »	21,6	21,0	24,4	21,3	26,6
Length of base of anal . . . . . » » » »	10,5	11,3	8,4	8,2	7,8
Least height of caudal peduncle . . . . . » » » »	5,9	5,2	7,1	7,2	7,8
Diameter of eye in % of length of head	19,0	19,6	19,3	16,9	17,0

From a comparison of these measurements becomes apparent that the only differences worth mentioning consist therein that the *Haplochiton* has a somewhat shorter mandible, a slenderer caudal peduncle and its dorsal fin in a more posterior situation, while the other proportions are practically identical with those of the charr from Northern Sweden, or at least so similar in both that they can be regarded as lying within the limits of a reasonable variation for a single species.

14. **Galaxias attenuatus** (JENYNS).

Numerous specimens collected just above the mouth of a fresh-water rivulet, Port Albemarle, West Falkland. 9th of September 1902.

The specimens are all of them small, the largest measuring 7 cm. "Ground colour yellowish, semipellucid, with numerous small dark spots."

Fishes from South Georgia.

Eight species of fishes were described from this region by J. G. FISCHER 1885 [1] from the collections of the German Expedition to South Georgia 1882—83. The Swedish Expedition has had the opportunity to bring back from this isolated island a very valuable collection of fishes which increases its known fauna with not less than 10 species of which the greater part is specifically or at least subspecifically new to science, but the present collection has only 3 species in common with that from the German Expedition. Taken all together there are thus 18 species of fish known from the coast of South Georgia. Of these half the number (4 described by FISCHER, and 5 here), for all we know at present, are endemic there as they have not been found elsewhere. Four others are as species known and described from other localities as well, but appear to be represented at South Georgia by a separate race or geographical subspecies, which in some instances is rather sharply defined from the main type. Only five of the whole lot, or less than a third of the known fauna, are, as it seems, wholly identical with fishes found in other localities as well. This speaks strongly for the long and complete isolation of the shore region of South Georgia from other shores or shallow waters. Of the fishes known from other localities *Notothenia coriiceps* may be regarded as circumpolar, and it enters also the true Antarctic region.[2] *Harpagifer* has also a wide distribution from Kerguelen to the Magellan territory. *Muræenolepis* has a similar distribution, but the one found at South Georgia and in the Magellan territory seems racially different from the Kerguelen specimens. *Notothenia macrocephala* is subantarctic circumpolar, but forms certainly a well defined subspecies at South Georgia. *Notothenia marionensis* is described from Marion Island as the name indicates, but the South Georgia fish appears to be somewhat different. *Notothenia mizops* is before known from Kerguelen Land and the same race as the one of South Georgia is also truly antarctic. Two species of *Trematomus*, described from Victoria Land and thus truly antarctic, are represented by subspecies at South Georgia. The new *Notothenia larseni* has by this Expedition also been found in the true Antarctic region (conf. below p. 46). These facts are highly interesting because they prove that, if the circumpolar and widely distributed fishes which are found as well in the Magellan territory as at Kerguelen Land are not counted, the Ichthys of South Georgia has more affinities

[1] Jahrb. Hamburg. wiss. Anstalt für 1884. Hamburg 1885.

[2] Victoria Land, "Southern Cross" collections.

with the much more distant eastern districts, Marion Island and Kerguelen Land (one species in common with either) than with the nearer situated western districts, Falklands and Tierra del Fuego (no species in common). But with the true Antarctic region the relationship is closest (four species in common). The latter fact is still more confirmed by the fact that the just discovered genus *Artedidraco* has one species at South Georgia, the other in the true Antarctic.

1. **Trematomus hansoni** BOULENGER n. subsp. **georgianus**.

(Pl. V. Fig. 17.)

5 specimens caught on long-lines in a depth of 78 to 92 m. outside Boiler Harbour, Cumberland Bay, South Georgia the 22d May 1902.

3 specimens caught on long-lines in a depth of 100 m., clayey bottom, Cumberland Bay, South Georgia the 20th May 1902.

D. (V*) VI, 36—38. A. (31) 32—33. Sq. 65—70.

Depth of body 4 to 5 times in total length including caudal, $3^3/_4$ to $4^1/_2$ times without caudal. Length of head $3^1/_2$ to $2^2/_3$ times in total length without caudal. Thickness of head at preopercles $^5/_7$ of length of head. Diameter of eye not quite equal to length of snout, 4 to $4^1/_2$ times in length of head. Interorbital width $6^1/_2$ times (in the smallest) to 5 times in length of head. Maxillary extending to below centre of eye, in the smallest, only to the vertical through the anterior margin of the pupil. Lower jaw not projecting beyond upper. Cheeks, opercle, occiput and interorbital region to between the nostrils densely covered with rather large scales. About 15—16 rather short gill-rakers on lower part of anterior arch. Pectoral long, almost square-cut posteriorly, but with the lower portion somewhat rounded, only a little shorter than head and reaching beyond origin of anal. Ventral $^2/_3$ length of head. Caudal truncate. Caudal peduncle deeper than long, its depth about $2^3/_4$ times in length of head. Upper lateral line 39—46 with well developed tubules, lower lateral line only represented by a series of pits which, however, nearly reach the hind margin of the pectoral.

The colour is said, on the label to have been of an undefined grey above, white below, but without spots or other markings. The smallest specimen is about 24 cm., the others about equal inter se 31—33 cm. Peritoneum black. All specimens females, but the ovaries were not ripe.

It is quite evident that these fishes from South Georgia are closely allied to the species, which BOULENGER has described under the name *T. hansoni* among the collections of the "Southern Cross" expedition from Victoria Land, but, on the other hand, certain differences from the same make themselves known in all the

* in 1 specimen.

present specimens. In such a case it is most suitable to signify the fishes from South Georgia with a third name, as through such a proceeding, as well the relationship as the diversity are accounted for. The most apparent dissimilarity, which is observed at the first look, is the different shape of the pectoral which in the fishes from South Georgia is truncate, and has the same general outline as that same organ of *T. newnesi*, while the typical *T. hansoni* has a rounded pectoral. The interorbital width of younger specimens of the subspecies is apparently somewhat narrower than that of the types in which it is contained only $4^1/_2$ to 5 times in length of head. In the same way the eye of the subspecies appears to be comparatively a little smaller. The number of rays of second dorsal and anal is smaller in the subspecies than in the types. The differences are satisfactory for the distinction of a geographic subspecies, but hardly more. The great distance between Victoria Land and South Georgia and the thereby effected complete isolation of the two races are sufficient to explain the differences, and it would almost have appeared stranger if there had not existed any differences at all between the *Trematomus hansoni* of the two coasts mentioned above.

The specimens from the "Southern Cross" expedition had been collected in shallower water, 3 to 8 fathoms. The different physical conditions of the two countries may explain this difference in habitat, but the average smaller size of the specimens from Victoria Land must also be considered.

Before this no species of *Trematomus* was known outside the Australian quadrant, or north of the Antarctic polar circle. The distribution of the genus is, however, by the discoveries of the Swedish Antarctic Expedition widened in a very considerable degree, and it is made more than probable that it is circumpolar, as three different species (conf. p. 45) have been found in the American quadrant and two of them so far north as at South Georgia.

2. **Trematomus bernacchii** BOULENGER n. subsp. **vicarius.**

1 specimen caught on long-lines outside Boiler Harbour, Cumberland Bay, South Georgia, in a depth of 30 m. 19th of May 1902.

D. V, 33; A. 31; Sq. 56—59.

Very thick-headed with the back in front of first dorsal broad and flattened. Depth of body $3^1/_2$ times in total length without caudal. Length of head $3^1/_3$ times in the same. Thickness of head at preopercles fully $^4/_5$ (83 %) of its length. Interorbital width $4^4/_5$ times in length of head. Diameter of eye $4^3/_5$ times in length of head. Maxillary extending to below anterior third of eye. Lower jaw not projecting beyond snout. Interorbital region flat, its anterior portion only scaly in the middle. Opercle, occipital region and cheek scaly, snout and preorbital naked. About

a dozen rather short gill-rakers on lower part of anterior arch. Pectoral rounded, $1^1/_3$ times in length of head, but reaching beyond origin of anal. Ventral a little longer than pectoral, about $1^1/_5$ times in length of head. Caudal rather small, rounded. Caudal peduncle much deeper than long, hardly more than 3 times in length of head. Upper lateral line about 34 scales, lower represented by a series of about 36 small pits.

Total length (without caudal) of the single specimen	240 mm.
Length of head	72 »
Interorbital width	15 »
Diameter of eye	15,5 »
Width of head at preopercles	60 »
Depth of body	67 »
Depth of caudal peduncle	23 »
Distance from snout to origin of first dorsal	75 »

The specimen was a male with little developed genital organs.

The general appearance of this fish reminds one of *Trematomus bernacchii* BOULENGER and it may perhaps most suitably be regarded as a geographic subspecies of the same. The fish from South Georgia appears to differ from the typical *T. bernacchii* in having a larger head (only $3^1/_3$ instead of $3^1/_2$ to 4 times in total length), a smaller eye ($4^3/_5$ instead of $3^1/_2$ to 4 times in length of head), the interorbital space somewhat more scaly and a smaller number of fin rays as well as fewer scales in a longitudinal series. BOULENGER had 44 specimens of the typical *T. bernacchii* from the "Southern Cross" collections and his diagnose may accordingly be expected to indicate the normal limits of variation of this species. For this reason the aberrations from the typical *T. bernacchii* which this single specimen from South Georgia shows, gain importance and cannot be disregarded, but, on the contrary, recognized as characterizing a separate geographic subspecies.

Trematomus bernacchii was originally found at Victoria Land in a depth from 3 to 8 fathoms, thus at the opposite side of the globe and within the true Antarctic region. The great distance of South Georgia from the Antarctic lands and islands, and the isolation caused by this give full explanation for the differentiation of this subspecies, to which fact there are many analogies.

3. **Notothenia marionensis** GÜNTHER (= **N. angustifrons** FISCHER).

6 specimens from stat. 28, Boiler Harbour, Cumberland Bay, South Georgia, depth 12—15 m., sand and algæ. 24th of May 1902.

2 specimens from stat. 36, the same locality, depth 1—2 m., small stones and sand. 13th of June 1902.

With BOULENGER[1] I feel convinced that FISCHER's *Notothenia angustifrons*[2] ought to be referred to GÜNTHER's *N. marionensis*[3] in such a way that both belong to the same species. I am, however, uncertain whether there is a subspecific difference between the fishes from Marion Island and South Georgia, or not. The formula for the vertical fins of GÜNTHER's small specimen is given as "D 7/29, A. 25."[3] FISCHER records: "D. 6—29; A. 30." In the present specimens I have counted in most cases d. VI, 30 (31), a. 30. There is thus a difference in the number of anal rays. The interorbital width is also, as it seems, narrower in the fish from South Georgia, and contained about 10 times in the length of head. The snout is also longer than eye in the adult, but not in the young.

As GÜNTHER only had a single specimen it is, however, best to leave the question about the subspecific difference, alluded to above, open as yet. Should such a difference be proved, the name of the fish from South Georgia will be *Notothenia marionensis angustifrons*.

The general shape, the strongly ctenoid, rather large scales, and their distribution on the head and body etc. make this species easily recognizable.

The largest specimen in this collection measures 120 mm. without caudal.

4. **Notothenia dubia** n. sp.

(Pl. III fig. 9.)

3 specimens caught in a net sunk to a depth of 20 m. in Boiler Harbour, Cumberland Bay, South Georgia. 30th of May 1902.

Among the collections from South Georgia, Boiler Harbour were three small specimens of a *Notothenia* which I cannot refer to any of the known species. They may therefore be described here under the above given provisional name.

Depth of body about 5 times in total length without caudal. Length of head about $3^1/_2$ to $3^3/_5$ times in total length. Diameter of eye about 4 times in length of head. Interorbital width about $6^1/_2$ times in length of head. Head and body compressed, upper and lower contour-lines almost similar. Snout shorter than diameter of eye or at most in the smallest specimen equal to the same. Mouth a little oblique, lower jaw projecting a little beyond upper, maxillary reaching to below anterior fourth of eye. Opercular and occipital regions covered with small and thin scales, which extend at least to posterior portion of interorbital region, but it is difficult to see how far. Dorsal V, 35. Anal 32. Pectoral rounded nearly as long as head reaching beyond origin of anal. Ventral very little shorter, about $^5/_6$ of length

[1] Report "Southern Cross". Pisces. London 1902.
[2] Jahrb. wiss. Anstalten Hamburg 1884. Hamburg 1885.
[3] Report "Challenger". Shore Fishes. London 1880.

of head, reaching beyond origin of anal, with blunt tips. Caudal truncate. Caudal peduncle a little shorter than deep. Scales thin, ctenoid, comparatively large on posterior part of the body. Upper lateral line with 25—30 tubular scales, lower not conspicuously developed.* In a specimen with 25 tubular scales in upper lateral line about 20 more scales can be counted from posterior end of the lateral line to caudal fin. The total number in a longitudinal series of scales above the lateral line might be approximately about 60.

The length of the three specimens is from 39 to 45 mm. without caudal fin.

The number of rays in dorsal and anal fins of this fish resemble the corresponding ones of *N. longipes*. The ventral fins appear to be even longer than in the latter species. The general appearance of these two fishes is, however, quite different. *N. longipes* is less compressed and its depth of body is, at least in young specimens, smaller when compared with the total length than in the fish named *N. dubia*. The latter has also much smaller eyes, the diameter of which is shorter than snout (in *N. longipes* longer). The scales of the head are much better developed in *N. longipes* and even in small specimens seen all over the whole interorbital region. This comparison between specimens of similar size proves the diversity of the two fishes mentioned. From *N. nicolai* the present fish differs through its scaly occiput, and the same character prohibits its referring to *N. coriiceps* and *N. cyaneobrancha*, the two latter also having a much broader and more depressed head of entirely different shape. *N. elegans* has a narrower interorbital region, and the eyes longer than the snout. *N. marionensis* has a much narrower interorbital space with better developed scales and less compressed body and head, different number of fin rays etc. *N. mizops* has a narrower interorbital space, still longer ventrals, deeper caudal peduncle, larger eyes etc. *N. sima* has different number of fin rays, better developed scales on the head, larger eyes etc. *N. tesselata* has much shorter ventrals, larger eyes, more scaly head etc.

The differences between the 3 specimens of *Notothenia* from Boiler Harbour and other species of *Notothenia* are thus quite apparent without the necessity of extending the comparison to the species with extremely broad or extremely narrow interorbital space.

A few comparative measurements of *N. dubia* are recorded below.

Total length without caudal in mm.	43.5
Length of head in % of total length without caudal	27,8
» » snout » » » » » » »	9.2
Diameter of eye » » » » » » »	7,1
Interorbital width » » » » » » »	14.9
Length of ventral fin » » » » » » »	23.9
Depth of caudal peduncle » » » » » »	7,4

* The line with a corresponding situation in the figure (fig. 9 Pl. III) represents only the very conspicuous limit between the upper and lower portions of the lateral muscles.

5. **Notothenia mizops** GÜNTHER var. **nudifrons**.

(Pl. 1 fig. 2.)

1 specimen from stat. 17 near Shag Rocks (W. of South Georgia, depth 160 m., gravel and sand, temperature + 2,05° C. 19th of April 1902.

Many specimens from stat. 20, Antarctic Bay (just outside the glacier), South Georgia, depth 250 m., small stones. 6th of May 1902.

8 specimens from stat. 22, Cumberland Bay, South Georgia, depth 75 m. clay and some algæ, temperature + 1,5 C. 14th of May 1902.

4 specimens from stat. 25, outside Boiler Harbour, Cumberland Bay, South Georgia, depth 52—24 m., grey clay with some algæ. 23d of May 1902.

5 specimens from stat. 26, outside Boiler Harbour, Cumberland Bay, South Georgia, depth 30 m., stones and algæ. 24th of May 1902.

5 specimens from stat. 28, Boiler Harbour, Cumberland Bay, South Georgia, depth 12—15 m., sand and algæ. 24th of May 1902.

1 specimen from stat. 32, South-fjord, Cumberland Bay, South Georgia, depth 195 m., clay with stones, temperature + 1,45° C. 29th of May 1902.

Many specimens caught in a large net, sunk to a depth of 20 m., Boiler Harbour, Cumberland Bay, South Georgia, clay and algæ. 30th of May 1902.

I was in great doubt concerning this fish, because its entire occipital and interorbital regions are scaleless in adult as well as in young specimens,[1] while GÜNTHER in the original description says:[2] "The crown of the head is covered with minute scales to between the eyes, the snout and præorbital being scaleless." In his synopsis of the species of *Notothenia* BOULENGER[3] also places *N. mizops* in a group with the "interorbital region scaly". But the last mentioned author has now been so kind as to compare a couple of specimens from South Georgia with the type specimens of *Notothenia mizops* of corresponding size and then found that both belong to one and the same species, as he kindly has communicated to me in a letter. I have therefore only recorded the fish from South Georgia as a bald-headed form of *Notothenia mizops* with which it agrees with the exception of its not scaly crown of head.

The following table of comparative measurements shows the direction of the development of some organs of this fish.

[1] Only in a single specimen I have found some few scattered scales on the crown.

[2] "Challenger" Reports: Zoology. Vol. 1. Shore fishes p. 16. London 1880.

[3] Report on the Collections of the "Southern Cross". Pisces p. 183. London 1902.

Total length without caudal in mm. . .	108	103	100	92	68	65	64	58	57	42	40,5	36,8	36
Length of head in % of tot. l. without caudal	29,4	28,2	29	29,3	28,2	29,2	28,4	27,6	29	30,4	29,6	29,9	27,7
» » snout » » » » » »	9,1	8,7	8,5	8,7	8,8	8,2	9,1	8,6	8,6	7,6	7,2	7,3	8,3
Diameter of eye » » » » » »	9,7	9,2	9,5	9,8	9,9	9,2	10,6	9	8,9	9,5	8,0	8,7	8,0
Length of ventrals » » » » » »	27,3	23,3	26	27,2	26,7	24,9	28,1	28,9	28,3	28,6	26,2	29,9	26,6
Depth of caudal peduncle . . . » » » » »	8,3	9,0	9,0	7,6	7,6	9,1	8,3	8,3	8,4	9,5	9,9	10,3	10,5
Interorbital width [1] in % of length of head	6,3	7,9	7,9	7,4	9,4	11,6	9,3	7,5	7,2	7,8	10	10	11

From these measurements is conspicuous that the snout, as usual, is smaller in younger individuals than in older, but also that, contrary to the rule, the eyes are comparatively smaller and the interorbital space broader in young than in old specimens.

Notothenia mizops var. *nudifrons* appears to be very common at the coast of South Georgia in a depth from 10 to 250 m. But it was also found further south within the truly antarctic region as is recorded in another chapter. *N. mizops* was originally described from Kerguelen Land. The distribution of the species is thus by the discoveries of the Swedish Antarctic Expedition proved to extend over at least half the subantarctic region over the Atlantic and Indian quadrants.

The colour of one specimen of this fish is shown on Pl. I fig. 2 where a sketch made by Mr. SKOTTSBERG from a living specimen is reproduced. Concerning the colours of the specimens caught at stat. 20 the label informs us: "the largest brownish red on the sides, the others with dark spots on a whitish ground-colour, belly white".

6. **Notothenia larseni** [2] n. sp.

(Pl. I fig. 3)

1 specimen from stat. 17, Shag Rocks, W. of South Georgia, depth 160 m., gravel and sand, temperature at bottom + 2,05° C. 19th of April 1902.

5 specimens from stat. 34, outside Cumberland Bay, South Georgia, depth 252—310 m., grey clay mixed with some few stones, temperature + 1,45° C. 5th of June 1902.

D. VI, 37—39. A. 38. P. 26. Sq. 69—76.

Depth of body $4^1/_3$ to 5 times in total length without caudal. Length of head $3^2/_3$ times in total length. Head and body rather compressed. Head rather pointed with eyes protruding. Upper contour from snout to first dorsal almost a straight line. Diameter of eye 3 times in length of head. Interorbital width 11 to 13 times

[1] The supraocular skin is not contained in this measurement.

[2] Named after Captain C. A. LARSEN renowned from his voyages in the Antarctic regions, and chief navigator of the Swedish Antarctic expedition.

in length of head. Snout $^3/_4$ to $^5/_6$ of diameter of eye. Maxillary not reaching further than below anterior sixth, or at most fifth, of the eye. Lower lip slightly projecting beyond upper. Head entirely scaly, even the snout and preorbital to the lips, and the mandible. No enlarged teeth. Pectoral a little shorter than head. Ventrals just reaching anal, $^3/_4$ length of head. Caudal rounded. Upper lateral line very conspicuous with 55—56 tubular openings, lower lateral line almost obsolete, represented by a series of pits which is not continuous. 5 or 6 scales between the lateral line and the first dorsal. Depth of caudal peduncle equal to or only little greater than its length. Three dark transverse bands on the postanal portion of the body. Small black dots on the dorsal form here and there irregular, oblique bands.

This fish is no doubt related to *Notothenia mizops* GÜNTHER and *N. acuta* GÜNTHER, both originally found at Kerguelen Land, it is, however, very easily distinguished from both by the different distribution of scales on the head. *N. mizops* and *acuta* have no scales on snout and preorbital, which parts in *N. larseni* are completely covered by comparatively large and well developed scales. The number of rays in dorsal and anal fins of *N. larseni* is also greater * and it has a still narrower interorbital region than the *Nototheniæ* from Kerguelen Land.

For further comparison a few direct measurements are recorded below.

Total length withouth caudal	178	139 mm.
Height of body	35	32 »
» caudal peduncle	12.5	10 »
Length » »	11	10 »
» » head	48	39 »
Height of head at occiput	29	25 »
Diameter of eye	16	13 »
Length of snout	12.5	10.5 »
Interorbital width	4.5	3 »
Length of ventral	34	29 »

The colours of the living specimen is shown on the accompanying plate (Pl. I fig. 3) which is reproduced after the original painting by Dr. C. SKOTTSBERG from a living specimen from Cumberland Bay.

In quite young specimens (measuring to 6 cm.) the interorbital is comparatively not quite so narrow, which is a juvenile characteristic. It is contained only 8 or 9 times in the length of head. The ventrals are nearly as long as the head. The other relative dimensions are, however, the same as in the adult. When the young specimens are considered it appears probable that this species has some affinity to *N. longipes* from which it, however, even in this stage is easily distin-

* In *N. mizops* the formula is D. IV—V, 35—37; A. 33—35 and in *N. acuta* D. VI, 30; A. 32, according to BOULENGER (Fishes of the "Southern Cross" Exp.).

guished by the larger number of fin rays especially in the anal. The height of the first dorsal is also greater, in the smallest specimens equal to $^1/_2$, in the adult to $^2/_3$ of the length of the head.

7. **Notothenia gibberifrons** n. sp.

(Pl. III Fig. 10.)

Numerous young specimens from stat. 20, Antarctic Bay (just outside the glacier), South Georgia, depth 250, small stones. 6th of May 1902.

Numerous specimens from stat. 22, Cumberland Bay, South Georgia, depth 75 m., clay and some algæ, temperature + 1,5° C. 14th of May 1902.

1 specimen from stat. 23 outside the mouth of the Moraine-fjord, Cumberland Bay, South Georgia, depth 64—74 m., grey clay with stones and gravel, temperature + 1,65° C. 16th of May 1902.

1 specimen, outside Boiler Harbour, Cumberland Bay, South Georgia, depth 30 m., caught on long-lines. 19th of May 1902.

2 specimens from Cumberland Bay, South Georgia, depth 100 m., clay, caught on long-lines. 20th of May 1902.

2 specimens from stat. 34 outside Cumberland Bay, depth 252—310 m., grey clay and a few stones, temperature + 1,45° C. 5th of June 1902.

1 specimen from stat. 37, Boiler Harbour, Cumberland Bay, South Georgia, depth 20 m., mud. 14th of June 1902.

D. VII, 31—32. A. 31—33. Sq. 68—75.

Head and anterior part of body depressed, postanal portion longish, fusiform. Snout and ocular region of head compressed with rather steep profile contour of eyes. Depth of body 5 to $5^1/_3$ in larger, about 6 times in younger specimens in total length without caudal. Length of head $3^1/_4$ to $3^8/_9$ times in total length without caudal. Diameter of eye in large specimens $4^3/_4$ times, in small about 3 times in length of head. Snout about equal to diameter of eye. Interorbital width very narrow, about 12 to $12^1/_2$ times in length of head. Posterior end of maxillary not reaching the vertical through the anterior margin of the eye except in quite small specimens. Lower jaw not projecting. Upper and lateral surfaces of head densely covered with sharply ctenoid scales with the exception of the præorbital region and the lip. On the snout the scales extend on either side in front of nostrils but leave a bare spot anteriorly in the middle. Longest spines of first dorsal subequal to longest rays of second dorsal and about half as long as head. Pectoral truncate, rounded below, in adult specimens $^4/_5$ of length of head, in smaller specimens still longer, almost as long as head and always reaching a good deal beyond origin of

anal. Ventrals shorter, in adult specimens not quite $^2/_3$ of length of head, in smaller about $^3/_4$ of the same. Caudal truncate. Depth and length of caudal peduncle subequal or the former a little greater. Scales sharply ctenoid everywhere. Upper lateral line with a variable number of tubular scales from 36 to 51. Lower lateral line well developed, long, always extending so far forward that it partly is covered by the pectoral, with 32 to 41 tubulated scales.

In young specimens the sides of the body are spotted, and the irregular dark spots may be more or less plainly arranged in longitudinal series. In adult specimens these spots are partly confluent and the pattern still less regular. Pectoral and caudal fins are transversally banded with darker, dorsal and, more faintly, anal fins are obliquely and longitudinally banded. The pigment is better developed on the web than on the rays and this may sometimes result in series of spots taking the place of the bands.

This species of *Notothenia* is very easily recognized on that hump on the forehead which has caused me to name it *gibberifrons*, and which is developed even in young specimens not measuring more than 5—6 cm. in length. Still smaller specimens may be recognized on the steep profile even if the hump is not yet developed.

The following series of comparative measurements serve to show in some respects the direction of the ontogenetic development.

Total length without caudal in mm.	36	59	143	255	270	274
Length of head in % of total length without caudal	30,6	27.1	25,8	29,8	27,8	28.1
Diameter of eye » » » » » » »	9,2	9,3	8,4	6.2	5,9	6.2
Length of snout » » » » » » »	8.3	9,3	8,4	9.0	8,5	8.5
Depth of body » » » » » » »	—	—	16,1	17,7	19.3	18.2
» » caudal peduncle » » » » » » »	7	6,8	6,3	6.7	7.4	6.2
Length of pectoral » » » » » » »	27.8	25,4	23,1	23,5	22.6	23,0
» » ventral » » » » » » »	25.0	22.9	18,9	18,2	17,4	17.5
Interorbital width in % of length of head	7.3	8,1	8,1	8,0	8,0	7.8

Diameter of eye, and length of paired fins steadily decreases with age.

8. **Notothenia macrocephala** GÜNTHER subsp. **marmorata** FISCHER.*

6 specimens caught on hand-line among *Macrocystis* in a depth of 4 m., Cumberland Bay, May-cove, South Georgia. 9th of May 1902.

10 specimens caught on long-lines in a depth of 10 m., Boiler Harbour, Cumberland Bay, South Georgia. 18th of May 1902.

6 specimens caught on long-lines in a depth of 30 m. outside Boiler Harbour, South Georgia. 18th of May 1902.

* Fische aus Süd-Georgien. Jahrb. wiss. Anstalten Hamburg für 1884. Hamburg 1885.

1 specimen caught on long-lines in a depth of 100 m., clayey bottom, Cumberland Bay, South Georgia. 20th of May 1902.

1 specimen from stat. 22, Cumberland Bay, South Georgia, depth 75 m., clay and some algæ, temperature at the bottom + 1,5° C. 14th of May 1902.

1 specimen from stat. 32, South Fjord, Cumberland Bay, South Georgia, depth 195 m., clay mixed with stones, temperature at the bottom + 1,45° C. 29th of May 1902.

2 young specimens from stat. 33, Boiler Harbour, Cumberland Bay, South Georgia, depth 22 m., clay and algæ. 30th of May 1902.

In his repeatedly quoted paper on the fishes of the "Southern Cross" Expedition BOULENGER puts *N. marmorata* FISCHER as fully synonymous with *N. macrocephala* GÜNTHER. Although there cannot prevail any doubt about the close relationship between the two forms which have received the name just mentioned I think it is most correct to maintain FISCHER's name *marmorata* as a mark of subspecific distinction for the fish of South Georgia. There appears namely to be some constant differences between the latter and those from other localities. If firstly the number of fin-rays is considered, the fish from South Georgia seems to differ in a remarkable degree. BOULENGER indicates (l. c.) the formula of the dorsal to be IV, 29—30, and that of the anal 23—25 in the typical *N. macrocephala*. The original diagnose of GÜNTHER * had "D. V, 30—31, A. 21." In one specimen out of fifteen I have found only 4 spines in first dorsal, in four 5, in eight 6, and in two 7. The rays of second dorsal were in two specimens 33, in six 34, in six 35 and in one 37. The anal rays were in one specimen 27, in ten 28 and in four 29. The formula for the fish from South Georgia may be compiled from this to be D. (IV) V—VII, 33—35 (37); A. (27) 28—29. A racial or subspecific difference appears to be clearly founded on these facts. The number of scales as well, is greater in the subspecies *marmorata* in which a longitudinal series of scales above the lateral line appears to contain from 67 to 76 scales, against 58 to 62 in the typical *macrocephala* according to BOULENGER (l. c.). FISCHER based his diagnose of *N. marmorata* only on three specimens which appear to have had a, for this subspecies comparatively low number of rays, so that the formula in the original description of *N. marmorata* was D. V, 33; A. 26 (28). The small number of type specimens together with this less aberrant formula for the fin rays probably made BOULENGER assume the identity of *macrocephala* and *marmorata*.

The interorbital width appears to be smaller in *N. marmorata* than in the typical *N. macrocephala*. The latter is namely said to have its interorbital width contained only $2^1/_3$ to $2^1/_2$ times in length of head, while I have found the same rela-

* Cat. Fishes Brit. Mus. Vol. II. London 1860, p. 263.

tion in *marmorata* to be, as a rule, 3, and in a very old individual even $3^2/_5$, which latter may be an exception.

For further comparison the following table of comparative measurements has been prepared from 6 specimens of *N. marmorata* representing different stages of growth.

Total length without caudal in mm.	72	129	140	268	280	468
Length of head in % of total length	30.5	30.2	28,9	28,0	31.4	34,2
Interorbital width » » » »	8,3	9,6	9,6	9,7	10.3	10,0
Length of mandible » » »	13,9	13,9	14	13,8	15,7	17,9
» » maxillary » » » »	12,5	12,4	12,8	12,3	13,4	16,0
Distance from snout to first dorsal » »	—	30,2	30.0	28,3	30 0	30,8
» » » anal » »	—	53.1	53.6	54,7	57.2	58,3
Length of ventral » » »	22,2	20,8	17,9	17,2	17,9	15 0
Depth of caudal peduncle »	11,1	9,7	10,0	9,3	10,4	8,1
Diameter of eye »	6,9	6,4	6,6	5,2	5,4	4,7

The direction of the development of some parts is made clear through this. Most remarkable is the increase of the maxillary and mandible with age, indicating that the larger specimens become even comparatively more rapacious. The distance from snout to anal increases also gradually with age, while the distance from snout to first dorsal is rather constant. The interorbital width increases, but the diameter of eye decreases comparatively, as usually is the case.

The upper lateral line has from 39 to 50 scales, the lower 14 to 17.

The younger and smaller specimens of this fish, which live in less depth, very well deserve the name *marmorata*, as they are marbled with darker on light ground. Such marbled specimens may be seen with a length up to 24 cm. or somewhat more, perhaps, and be caught in a depth from 4 to 30 m. But in a depth of 30 some of the specimens are uniformly dark above, and in such a depth are found specimens which have attained a much greater size, from 30 to more than 50 cm. It is, however, not necessary that the large specimens lose their marbled colouration, as the very largest one in this collection has retained it. On the other hand, a specimen from station 22 might be termed melanistic, as it is quite black above and on the sides of head and body, in strong contrast to the whitish belly. The two smallest specimens which measure with caudal about 6, resp. 9 cm. are labelled as having been "yellowish brown on the back and upper parts in general, sides and belly bright silvery. Iris bright silvery".

9. **Parachænichthys georgianus** (FISCHER).

2 specimens, Boiler Harbour, South Georgia, depth 10 m., caught on hook and line 18th of May 1902.

The specimens of this interesting "pickerel-shaped" fish measured about 45 cm. without caudal. The colour was brown above, somewhat lighter below, with numerous roundish blackish dots on the back and the sides.

10. **Champsocephalus gunnari** [1] n. sp.

7 specimens from stat. 22, Cumberland Bay, South Georgia, depth 75 m., clay and algæ, temperature at the bottom + 1,5° C. 14th of May 1902.

2 specimens from stat. 32, South Fjord, Cumberland Bay, South Georgia, depth 195 m., clay mixed with stones, temperature at the bottom + 1,45° C. 29th of May 1902.

Similar to *Ch. esox* (GÜNTHER) in its general shape, but differing from the same in many points, with regard to number of fin-rays, relative dimensions etc., and as these differences are constant it appears to be the most correct proceeding to establish a new species for the *Champsocephalus* from South Georgia. The relative dimensions of the same and the discrepancies from *Ch. esox* shown by them become quite conspicuous from the table of measurements appended. For the identification of the fish from South Georgia even without the aid of careful measurements the following diagnose may be sufficient.

D. 9 (10 [2]) | (37 [2]) 38—40; A. 36—38.

Snout and upper jaw shorter than in *Ch. esox* so that the posterior end of the maxillary hardly reaches the vertical through the anterior margin of the pupil and never beyond the same (in *Ch. esox* to the middle of the pupil). Eye larger than in *Ch. esox*, only about 5 (or $5^1/_2$) times in length of head, measured without the opercular flap beyond the spine (in *Ch. esox* $6^2/_3$—$7^1/_2$). Interorbital width without supraorbital skin greater about $3^1/_2$—$3^2/_3$ times in length of head (in *Ch. esox* $4^1/_2$—5 times). The profile contour continues to rise considerably behind the eye, so that the height just in front of first dorsal equals the length of the snout and half the diameter of the eye, while the height at the same place in *Ch. esox* is a good deal shorter than the snout alone. Greatest thickness of head in the preopercular or opercular region decidedly greater than length of snout (in *Ch. esox* much shorter than snout). The opercle has at its posterior border two spines, the upper one of which is always divided at least in two but sometimes in three points. Pectoral very long, normally reaching to fifth or sixth anal ray and even in females with the belly distended by ripe ovaries reaching the second or third anal ray (in *Ch. esox* never reaching anal). Height of first dorsal variable, but its longest rays

[1] I take the liberty of naming this fish after Dr. J. GUNNAR ANDERSSON who was the chief of the expedition during its cruise to South Georgia.

[2] in one specimen out of 9.

always exceeding the length of the snout, sometimes equal to snout and eye together (in *Ch. esox* the longest rays of first dorsal are much shorter than snout). Anterior long rays of second dorsal also, as a rule, at least equal to, usually exceeding the snout in length (in *Ch. esox* they are much shorter than snout). Lower lateral line short, so that its length usually is contained four times or more in the distance between caudal and eye (in *Ch. esox* about three times). Depth of caudal peduncle not contained twice its length (in *Ch. esox* about thrice).

The colour of *Champsocephalus gunnari* does not appear to be so bright as in *Ch. esox*. It is in spirit dark leaden grey with some broad transverse black bands. Dorsal fins black, the others seem to have been more or less dusky, somewhat different in different specimens; at least the end of the caudal is black.

	Champsocephalus gunnari.									*Ch. esox* * average of	
										3 sp.	4 sp.
Total length with caudal in mm. . .	322	340	390	393	400	411	412	432	436	267.7	285.1
Length of head measured to the end of the opercular spine in % of tot. l.	28,2	27,4	26,7	27,7	26,8	26,3	28,4	26,6	27,5	29,0	28,2
Postorbital length of head » » » . .	10,9	10,6	10,5	11,2	10,3	10,5	11,0	10,9	11,2	11,3	10,7
Diameter of eye . . . . » » . »	6,1	5,3	5,4	5,6	5,3	5,1	5,1	5,1	5,0	4,5	4,4
Length of snout . . . . » » » »	11,8	11,5	11,3	11,5	11,5	11,2	11,8	10,9	11,7	13,3	13,2
Interorbital width . . . . » » » »	7,8	7,3	7,2	8,0	7,9	7,4	8,3	7,8	7,6	6,3	6,3
Length of maxillary . . » » » » »	13,4	13,2	12,8	12,7	13,3	12,7	13,3	13,2	13,3	16,0	15,9
Distance from snout to first dorsal . . . . . » » »	25,5	25,0	25,4	24,8	25,5	24,3	26,2	24,1	24,8	27,9	26,9
Distance from snout to base of ventrals . . . » » »	27,0	25,3	25,1	23,9	24,3	25,1	24,5	25,0	26,6	24,9	25,7
Length of pectoral . . . » » »	20,2	18,8	17,4	19,1	19,0	19,7	19,9	17,8	20,9	16,0	15,8
» » ventral . . . » » » »	18,0	16,2	15,4	15,0	17,3	15,3	16,3	14,8	15,4	14,8	15,5
Depth of body . . . . » » » »	12,7	13,5	14,0	15,2	15,5	14,8	13,8	14,8	14,5	12,9	12,4
Least depth of body . . » » . » »	3,7	4,3	3,6	3,9	4,1	3,7	4,3	3,9	4,0	3,7	3,6

The differences between the two species *Champsocephalus gunnari* and *Ch. esox* appear to stand in correspondence with their habits and occurrence. The latter which lives in shallower water and among vegetation has brighter colours, with numerous spots and transverse bars etc. which pattern evidently makes it less conspicuous in such surroundings. *Ch. gunnari* again seems to live in somewhat greater depth than its relative. It has therefore assumed more sombre colours and acquired larger eyes to facilitate the discovery of its prey. The greater fins indicate probably that it keeps itself suspended in mid water.

* The measurements of *Ch. esox* chiefly after F. A. SMITT: « Poissons de l'expédition à la Terre de feu sous la direction du Docteur O. NORDENSKIÖLD ». Bih. K. Vet.-Akad. Handl. Bd. 24. Stockholm 1898.

Artedidraco[1] n. g.

General appearance cottoid, head depressed as well as body entirely naked. Muciferous or sensory canal system well developed with large open, more or less tubular pores, on the head, and a series of such extending as an upper lateral line in the pectoral region of the body (conf. figs. 14 & 14 a Pl. IV). Gill-membranes broadly united to the isthmus, but gill-openings rather wide. A mental barbel. A single tubular nostril. Radii branchiostegales five. First dorsal with three rather long and flexible spines. Last ray of second dorsal connected by web with basal and dorsal part of the caudal. Scapular fenestra pierced between scapula, coracoid and clavicula (conf. fig. 14 b Pl. IV). Opercle transformed in a peculiar manner (conf. fig. 14 c Pl. IV), its posterior portion being curved inwards and then forwards forming a strongly bent flattened hook, between which and the head the cutaneous upper part of the gill-cover is expanded, thus closing the fenestra formed between this hook and the occiput. Subopercle a narrow thin plate below the opercle, interopercle small, wedged in between the former and præopercle. The latter deeply channelled for the muciferous system and then bridged over so that two round openings are formed on the vertical and three on the horizontal limb. Teeth conical, small, in broad bands on both jaws; palate toothless. Rather fleshy lips and a rather broad velum, above and below, inside the jaws.

This generic diagnose is chiefly based on specimens of *Artedidraco mirus* from South Georgia which is to be regarded as type species.

Artedidraco appears to be most nearly allied to *Harpagifer* RICHARDSON[2] from which it it easily distinguished through the presence of a barbel and the absence of spines on the opercle and subopercle. It is also allied to *Draconetta* JORDAN and FOWLER[3] which by C. TATE REGAN[4] has been referred to *Nototheniidæ*. With regard to the reduction of the opercle *Artedidraco* to a certain extent approaches *Draconetta*, the result has, however, become different, as in the latter genus a strong spine is developed, but in *Artedidraco* only a flattened hook, which hardly can be a weapon, especially in consequence of its direction. *Draconetta* differs also by having a strong subopercular spine, no barbel, no lateral line. With regard to the development of the sensory canal system *Artedidraco* and *Harpagifer* are rather similar to each other.

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[1] Named after PETER ARTEDI, "the father of Ichthyology", born in northern Sweden exactly 200 years ago. *Δράκων* the old greek name for *Trachinus*.

[2] Ichthyology of the Voy. of H. M. S. Erebus & Terror. London 1844—1848.

[3] Proc. U. S. Mus. Vol. 25. Washington 1903.

[4] Ann. & Mag. Nat. Hist. Ser. 7. Vol. XIV. Aug. 1904. London.

11. **Artedidraco mirus** n. g. & sp.

(Pl. I Fig. 4 & Pl. IV Fig. 14.)

1 specimen from stat. 20, Antaretic Bay (just outside the glacier), South Georgia, depth 250 m., small stones. 6th of May 1902.

2 specimens from stat. 22, Cumberland Bay, South Georgia, depth 75 m., clay and some algæ, temperature + 1,5° C. 12th of May 1902.

1 specimen from stat. 33, Boiler Harbour, Cumberland Bay, South Georgia, depth 22 m., clay and algæ. 30th of May 1902.

D. III, 23—24. A. 17.

Head broad, depressed, body compressed. Depth of body (at ventrals) not quite 4 times in total length without caudal in adult specimens, $4^1/_4$ times in young. Length of head about $2^3/_5$ to $2^2/_3$ times in total length without caudal. Interorbital width 8 to $8^3/_4$ times, in adult $7^1/_2$ to 8 times in length of head. Diameter of eye nearly 4 times in adult, $3^1/_2$ to $3^1/_3$ times in young, in length of head. Snout and eye subequal in adult, the former a little shorter in young. Lower jaw a little projecting, more in young than in adult. Distance from snout to vent $^5/_4$ (125—130 %) of distance from vent to root of caudal fin. Depth of caudal peduncle contained about 4 times in length of head. Length of caudal fin about $^2/_3$ of length of head in adult, nearly $^5/_6$ of the same in young. Pectoral rounded about $^2/_3$ of length of head. Ventrals a little less than $^1/_2$ length of head in adult male, a little more than $^1/_2$ length of head in adult female, $^3/_5$ of the same in young male, a little more than that in young female. First dorsal very narrow, in young specimens $^1/_4$ (♂) or $^1/_5$ (♀) of total length without caudal, in adult broader and shorter, $^1/_6$ (♂) to hardly more than $^1/_8$ (♀) of total length without caudal, in the last case hardly more than reaching second dorsal, in the first overlapping the same widely.

Barbel simple and bluntly pointed in females, not much more than $^1/_4$ of length of head; with a club-shaped end covered with small papillæ and equal to $^1/_3$ of length of head in males. The barbel is subequal to or usually longer than diameter of eye.

Some measurements of the four specimens obtained are recorded below:

	♂	♀	♀	♂
Total length without caudal	40 mm.	44 mm.	85 mm.	92 mm.
Length of head	15 »	17,5 »	32 »	35 »
Interorbital width	2 »	2,2 »	4 »	4 »
Diameter of eye	4,5 »	5 »	8 »	9 »
Length of snout	4 »	4,5 »	8 »	9,5 »
Length of pectoral	11 »	11 »	20 »	21 »
Length of ventral	9 »	11 »	17 »	16 »

	♂	♀	♀	♂
Distance from snout to vent	23 mm.	26 mm.	49 mm.	52 mm.
Distance from vent to base of caudal	18,5 »	20 »	37,5 »	42 »
Depth of body	8,5	10.5 »	22 »	24 »
Length of caudal	12.5 »	14 »	20 »	22 »
Height of first dorsal	10 »	9 »	11 »	14.5 »
Length of barbel	5 »	4,5 »	9 »	11 »

From this is apparent that in addition to the difference in shape of the barbel there are other sexual differences, especially apparent in the greater height of first dorsal in the male, and greater length of ventral in the female.

12. **Careproctus georgianus** n. sp.

(Pl. III Fig. 11.)

2 specimens from stat. 32, South Fjord, Cumberland Bay, South Georgia, depth 195 m., clay mixed with stones, temperature at the bottom + 1.45° C. 29th of May 1902.

D. 45—52. A. 42—46.

Thick anterior portion of the body or distance from snout to origin of anal contained about $2^4/_5$ times in posterior compressed portion of body counted from origin of anal to end of caudal fin. Length of head about 5 times in total length with caudal. Depth of body a little more than 4 times in total. Diameter of eye about 4 times in length of head. Interorbital width about $1^3/_4$ in length of head. Length of snout $2^3/_5$ to 3 times in length of head. Snout projecting beyond mouth. Corner of mouth extending to below the anterior third of eye. Teeth simple (not tricuspid). Transversal diameter of ventral disk about equal to half the length of head. Vent situated close behind posterior margin of ventral disk, its distance from origin of anal not much shorter than its distance from mouth. Anterior nostril tubular in front of the eye, its distance from the same about equal to half the diameter of the eye or the length of the tube itself. No trace of posterior nostrils. A series of rather large mucous pores along the lower and upper lip, and a pair of such on the snout, about midway between the nostrils and upper labial series. Gill opening narrow, about equal to diameter of eye, reaching to upper end of the base of the pectoral, but not beyond. Pectoral a little shorter than head, very little notched, 4—5 rays on either side of the ventral disk prolonged into a fringe. Dorsal and anal fin broadly continuous with the caudal which is truncate. Skin very loose, which renders the counting of the fin rays very difficult. The colouration in life is said to have been greyish, semipellucidous. The larger specimen (105 mm.) is darker than the smaller (63 mm.).

The following exact measurements admit a closer comparison with other species.

Total length including caudal	63 mm.	105 mm.
Depth of body	15 »	23 »
Length of head	13 »	21 »
Diameter of eye	3 »	5 »
Interorbital width	8 »	12 »
Length of snout	5 »	7 »
Transverse diameter of ventral disk	7 »	10 »
Distance from snout to origin of anal	22,5 »	37 »

This fish is rather similar to *Liparis steineni* FISCHER with regard to some relative dimensions, but differs widely from the same in having simple, not tricuspid, teeth and the vent situated close to the ventral disk. Concerning the situation of the vent in *Liparis steineni* FISCHER says in the diagnose [1] (l. c.): "Der After liegt dem Anfange der Analflosse etwas näher, als dem Hinterrande der Bauchscheibe." To make sure that there was no mistake about this, I wrote to Dr. L. REH in Hamburg and asked him kindly to reexamine the type-specimen of *Liparis steineni*. Having done so Dr. REH informs me that the vent of this specimen lies "mindestens 1 cm. hinter dem Hinterende der Saugscheibe, aber nur etwa 1/2 cm. von dem Vorderende der Analflosse". This important difference is therefore quite clear, and about the shape of the teeth cannot be any uncertainty as FISCHER declares them to be "dreispitzig" in *Liparis steineni*. This latter form is consequently just as clearly a *Liparis* as the present species is a *Careproctus*, although the dimensions of both are somewhat similar. As a *Careproctus*, however, the present species is less modified than other species of the same genus, and its disk is especially better developed. The fact that the diameter of the ventral disk is only contained twice in the length of the head, or twice as long as the diameter of the eye, approaches *Careproctus georgianus* to the members of the genus *Liparis* and separates it easily from all species of its own genus. It appears also to be the first known representative of *Careproctus*, not only in the antarctic waters, but on the southern hemisphere,[2] and forms thus a very important discovery. From South Georgia no other member of *Discoboli* has been recorded before, except the above mentioned specimens of *Liparis steineni* FISCHER, which were collected at the shore of Royal Bay. *C. georgianus* is of course an inhabitant of deep water but perhaps less so than some members of the genus, which may account for its less modified structure.

[1] Über Fische aus Süd-Georgien. Jahrb. wiss. Anstalten Hamburg für 1884. Hamburg 1885, p. 63.

[2] The most southern *Careproctus* hitherto described was *C. longifilis* GARMAN (Mem. Mus. Comp. Zool. Vol. XXIV Cambridge Mass. 1899) which was caught in a depth of 1,823 fathoms lat. 2° 35′ N.; long. 83° 53′ W. *C. longifilis* is, however, very different from the present species as it is a much more modified and a more pronounced deep-sea fish.

13. **Murænolepis marmoratus** GÜNTHER n. subsp. **microps.**

3 specimens South Georgia, Cumberland Bay, depth 100 m., clayey bottom, 20th of May 1902, caught on long-lines.

1 small specimen (about 13¹/₂ cm.) Boiler Harbour, Bay of Pots, Cumberland Bay, South Georgia, caught with a net from a depth of 20 m., clay and algæ. 30th of May 1902.

The type specimens of this species were originally collected by the "Challenger" Expedition at Kerguelen Land. GÜNTHER's description* does not agree in all respects with the specimens from South Georgia. In the small specimen, measuring about 14 cm., the eye is contained about 5 times, interorbital width about 4 times and snout about 3 times in length of head, while according to GÜNTHER all these dimensions are said to be about equal and "rather less than one-fourth of the length of the hea ".

In larger specimens measuring resp. 325 and 335 mm. in total length, the eye is contained about 6 times in length of head, interorbital width about 4 times, and snout 3 times. These relations are consequently similar to those of the small specimen; the only difference is that the eye is comparatively smaller, as usual, in older specimens.

In a quite young specimen of *Murænolepis* (measuring 85 mm.) from Tierra del Fuego (conf. p. 9) the eye is contained $4^2/_3$, interorbital width $3^2/_3$ and snout $2^4/_5$ times in length of head. The eye is thus comparatively larger, interorbital width and snout smaller as they ought to be in a young fish, but they are not equal as in the types of *Murænolepis marmoratus* GÜNTHER. The eye is in all stages of growth of this *Murænolepis* considerably smaller, when compared with the head, than in GÜNTHER's types, although the size of the latter was about equal to the two younger specimens of this collection, and at the same time the snout of these fishes is much longer. There appears therefore to be a constant difference in relative dimensions. To this may be added, that the barbel, which in GÜNTHER's types is said to be "shorter than the eye", in all the present specimens, young and oldi is longer than the eye. The dorsal filament is said to be "as long as the eye" in GÜNTHER's types, but in these specimens the former is considerably longer, both in young and old. Finally may be added an important characteristic from the ventrals, which in GÜNTHER's types are said to be "composed of five rays" but in all the specimens of this collection are provided with four rays only.

When all these differences are considered I feel compelled to regard the *Murænolepis* of South Georgia as a separate geographic subspecies distinct from that of Kerguelen Land. It is also represented at Tierra del Fuego (conf. p. 9).

* "Challenger": Report on the Shore fishes (Zoology Vol. I), p. 17—18.

Fishing at South Georgia.*

During the sojourn at South Georgia a great deal of fishing was done and, it must be said, with great success. Long lines were laid in Cumberland Bay usually in a depth of 70 to 100 m. and on clayey bottom. The hooks were chiefly baited with pieces of fish, sometimes with molluscs. Two or three lines each with 100 hooks were laid and when drawing the lines a fish was found on 70 percent of the hooks or more. *Notothenia macrocephala marmorata* and *Trematomus hansoni georgianus* were most numerous. Next to them in number was *Notothenia gibberifrons*, and not a few *Murænolepis* were also caught. In the harbour in Boiler Harbour a great number of fishes were caught on hook and handlines in a depth of 6 to 10 m., mud bottom. The two first mentioned species were also here most common. The "South Georgia pickerel" (*Parachænichthys georgianus*) delivered also its tribute to the kitchen although some of the sailors declared it to be "too ugly to be fit to eat". *Notothenia gibberifrons* was caught here as well, but no specimens of *Murænolepis*, which, at least when adult, lives in deeper water.

All fishes mentioned were white in the meat and regarded as very palatable.

Fishes from the true Antarctic region.

In the introduction has been set forth the reason why the present author regards the South Shetland Islands, Graham Land and neighbouring islands, lands and seas as truly antarctic and this need not to be repeated here. But with this definition of the Antarctic region its fauna has received by this Expedition an addition of importance. Seven species are recorded in this chapter. Three of these (*Trematomus newnesi*, *Notothenia nicolai* and *Pleurogramma*) were already described as Antarctic and recorded from Victoria Land by BOULENGER. The others are new to the Antarctic region, but two of them, although, as it seems, racially different, have been described from Kerguelen Land. The sixth species is just described in this report from South Georgia, and the seventh is entirely new although related to a species found at South Georgia. It is very remarkable that as far as has been found hitherto, the fauna of the South Shetland—Graham Land region has no fish in common with that of Tierra del Fuego, but shows more affinities with the fauna of subantarctic

* After the communications of Mr. K. A. ANDERSSON.

South Georgia and Kerguelen Land, not to speak of the antarctic Victoria Land. With the latter the Graham region has 3 species in common viz. those just mentioned above. With species from Kerguelen Land two fishes in the Graham region (*Chænichthys* and *Notothenia mizops*) agree, although subspecifically different. One of these (*N. mizops*) belongs also to the fauna of South Georgia with which the Graham region also shares *N. larseni* and the genus *Artedidraco*.

1. **Trematomus newnesi** BOULENGER.

1 specimen from stat. 4 at Paulet Island, depth 100—150 m., gravel and smal stones. 15th of Jan. 1902.

This fish was collected in a great number of specimens by the "Southern Cross'l expedition at Victoria Land (Cape Adare and Duke of York Island) and described by BOULENGER 1902. * It was by that expedition found in rather shallow water in a depth of 3 to 8 fathoms. It is thus to be regarded as a shore fish although the present specimen was obtained in a somewhat greater depth.

The conclusions set forth under the head of *Notothenia nicolai* in the following pages is corroborated by the similar conditions under which the present fish has been found.

2. **Notothenia mizops** GÜNTHER var. **nudifrons**.

5 specimens from stat. 5, at Cape Seymour, depth 150 m., sand and gravel. 16th of Jan. 1902.

2 specimens from stat. 6, south of Snow-Hill, depth 125 m., stones and gravel. 20th of Jan. 1902.

These fishes are quite similar to the specimens of the same species caught at South Georgia at various localities (conf. above p. 30).

Concerning the colour of the specimens from stat. 5 the label informs us: "Yellowish red above and on the sides, silvery white below, with two rows of dark spots on the sides; caudal, dorsal and anal fins white with yellowish spots."

3. **Notothenia nicolai** BOULENGER.

4 specimens caught in tide-pools on the shore of the Seymour Island from the 8th to the 11th February 1903.

* Report on the Collections of Natural History made in the Antarctic Regions during the Voyage of the "Southern Cross". London 1902.

This fish was first described by BOULENGER not long ago from the "Southern Cross" collections (l. c.) and had been found by that expedition at two localities at Victoria Land (Cape Adare and Duke of York Island) in the Australian quadrant. The locality where the present specimens have been collected is thus situated at a distance from the first mentioned of more than 130 longitudinal degrees. It may be concluded from this, that *Notothenia nicolai* has a very wide antarctic distribution, and probably is circumpolar. — It is evidently an inhabitant of the shallow water, as it has been found partly in tide-pools, by the Swedish Expedition, partly in a depth of 4 to 8 fathoms, by the Southern Cross expedition. This fact is of great importance as it hints at the existence of a very wide and continuous area of shallow water or that a coast-line still exists or has existed not long ago in the intervening region between Victoria Land and the Graham Land complex. It is namely not probable that exactly the same species of *Notothenia* should inhabit regions as wide apart as Seymour Island and Victoria Land if these were isolated by very large interspaces of any considerable depth, when the great variability of the *Nototheniidæ* and their faculty of developing geographic subspecies is taken into consideration. The last mentioned quality of this family appears to be very conspicuously displayed by a comparison of the Ichthys of South Georgia with other subantarctic districts.

4. **Notothenia larseni** n. sp.

(Pl. II fig. 6)

2 specimens from stat. 6, S. of Snow Hill, depth 125 m., gravel and stones. 16th of Jan. 1902.

The two specimens are not in very good condition, but in spite of this and their comparatively small size (58 mm. without caudal) I do not hesitate in referring them to the species which I have described as new among the fishes from South Georgia (p. 31). Small specimens of this species resemble those of *N. longipes* STEINDACHNER* but are easily recognized by the large number of anal rays. When I therefore counted 38 such in these fishes instead of 32, which is the number recorded for *N. longipes*, I could not have any doubts concerning their identity.

In stat. 78 W. of Snow Island, South Shetland in a depth of 110 m., the bottom material consisting of sand somewhat mixed with clay, and in a temperature of $-1{,}40°$ C. fishes were caught, but afterwards lost when the ship foundered. *Notothenia larseni* was represented among them and Mr. SKOTTSBERG made a sketch of such a specimen which was saved and now reproduced on Pl. II fig. 6. The long anal fin appears to be a good characteristic, also in this case.

* Ichthyologische Beitr. III. Sitzber. K. Akad. Wiss. Wien Bd. LXXII. Jahrg. 1875, p. 42—43

5. **Chænichthys rhinoceratus** RICHARDSON n. subsp. **hamatus.**

1 specimen, stat. 6, S. of Snow Hill, depth 125 m., stone and gravel. 20th of Jan. 1902.

It was of very great interest to find this fish among the collections of the Swedish South Polar Expedition as it hitherto was known only from the coast of Kerguelen Land, where it first was discovered by Sir JAMES ROSS' expedition with "Erebus" and "Terror" and described by RICHARDSON * 1844. The known distribution of this remarkable species of fish was through this later find extended to nearly one half of the Antarctic region. But on the other hand, there are facts that speak for the supposition that this distribution is discontinuous. There are namely some differences between the description and figure of RICHARDSON's type of *Chænichthys rhinoceratus* and this fish from Snow Hill. The most conspicuous at the first look is the different shape of the first dorsal. In the original type the longest ray of the first dorsal is the second, then resp. the third, fourth, first, fifth, sixth and seventh. In consequence of this and the rapid decrease in size of the four hindmost rays RICHARDSON could term the first dorsal of this fish "high and triangular". In the specimen from Snow Hill the order of the rays of the first dorsal according to size is as follows: $4 - 3 - 2 = 5 - 1 - 6 - 7$. This order, and the fact, that the sixth ray only, is by $^1/_8$ shorter than the first and that only by $^1/_{18}$ shorter than the equal second and fifth, give quite a different shape to the first dorsal of the *Chænichthys* from Snow Hill. The number of rays in the second dorsal was 35 in the original type, but in the present specimen 37. In a similar way the latter has an increased number of rays in the anal fin as well viz. 33, while the type had only 30. The pectoral of the former has 23 rays, that of the latter had only 20 according to the description. But this may be a mistake as the figure exhibits 23 pectoral rays and 32 anal rays. More important is the difference with regard to the preopercle. RICHARDSON says that the same in the type "has an obtuse process, or elbow, a little above the apex of the curve". But in the fish from Snow Hill the said bone has at the angle of the curve two short but stout and pointed spines. This characteristic has made me propose the name "*hamatus*" for the geographic race or subspecies which appears to be represented by the fish from Snow Hill and which differs from the type through the characteristics mentioned above.

The total length of the specimen from Snow Hill is about 33 cm. without caudal, and its colour is said to have been "bluish grey on the back and the sides".

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* Ichthyology of the Voyage of H. M. S. Erebus & Terror.

6. **Artedidraco skottsbergi** n. g. & sp.

(Pl. II fig. 7, Pl. IV fig. 15.)

1 specimen from stat. 6, S. of Snow Hill, depth 125 m., stones and gravel. 20th of Jan. 1902.

D. III, 25. A. 19.

Head less depressed, profile contour of snout steeper, body still more compressed than in *A. mirus*. Depth of body nearly 5 times in total length without caudal, length of head not quite 3 times. Interorbital width about 10 times in length of head. Diameter of eye very little more than 3 times in length of head. Snout a little shorter than eye. Lower jaw a little projecting. Distance from snout to vent 126 % of distance from vent to snout. Depth of caudal peduncle contained $3^{1}{}_{3}$ times in length of head. Length of caudal fin 85 % of length of head. Pectorals $^{4}/_{5}$ of length of head. Ventrals 65 % of length of head. First dorsal in the only preserved specimen rather narrow, half as long as head. * Barbel simple, $6^{2}{}_{3}$ times in length of head, not quite half as long as diameter of eye.

Concerning the colour is stated on the label of the preserved specimen: "Whitish with numerous dark spots on the sides and vertical fins." The distribution of these spots is seen on fig. 15 Pl. IV.

A second specimen of this interesting fish was caught at another opportunity viz. at stat. 81 Bransfield Strait, depth 849 m., mud and some few stones, temperature at the bottom — 1,55° C. the 25th of Nov. 1902. Mr. SKOTTSBERG made a sketch of this latter specimen, which was larger than the one described above. It was of course preserved since it had been figured, but belonged to the zoological treasures which were lost with the sinking vessel, "Antarctic". The sketch of this fish was unfortunately not so elaborate as the others because Mr. SKOTTSBERG was in a great hurry when making it. It also looks disfigured because it is drawn as if seen obliquely from above, but I have nevertheless deemed it to be worthy of reproduction for the sake of the colours, and to show that this species attains a greater size than the only specimen preserved.

Artedidraco skottsbergi is nearly related to *A. mirus*, but is easily recognized by its less depressed head with a steeper profile contour of the snout, greater depth of caudal peduncle, shorter barbel, longer fins and different coloration. The difference is perhaps more apparent at the first look than after comparison of measurements.

The dimensions of the only specimen now in existence are:

Total length without caudal	57 mm.
Length of head	20 »

* Probably comparatively shorter in adult specimens.

Interorbital width	2 mm.
Diameter of eye	6,3 »
Length of snout	5,5 »
» » pectoral	16 »
» » ventral	13 »
Distance from snout to vent	32 »
» » vent to base of caudal	26 »
Depth of body	12 »
Length of caudal fin	17 »
Height of first dorsal	9,5 »
Length of barbel	3 »

Artedidraco skottsbergi is a true antarctic representative of this genus, this is evident as well judging from the localities where it has been caught, as from the prevailing physical conditions where it lives, in a water with a temperature below zero!

7. **Pleuragramma antarcticum** BOULENGER.

1 specimen from the ventricle of *Leptonychotes weddelli*, of Jason Land $^{19}/_{1}$ 1902.

The tail of this specimen is broken off, but otherwise it is in a rather good condition and it can therefore be concluded that the figure, which BOULENGER has communicated in the "Report on the Collections of Natural History made in the Antarctic Regions during the Voyage of the Southern Cross" [1] Pl. XVIII, and which he regarded "as, to some extent, a restoration", is correct.

The find of *Pleuragramma* in the Graham Region is from a zoogeographical point of view very important, as it indicates that this, most antarctic of all fishes hitherto known, has a circumpolar distribution as it has been found at two almost opposite sides of the Antarctic Region.

Fishing at Paulet Island. [2]

During the winter 1903 it was a very useful as well as appreciated sport to fish with hook and handline through holes made in the ice. It was certainly rather hard work to make a satisfactory hole through the ice, which was about $1^{1}/_{2}$ m. thick, but when such a one was made, a rich reward sometimes remunerated the patient and diligent fisherman. With good luck the day's catch could amount to about 100 small fishes. All in all about 14,000 fishes were caught in this way by the, on Paulet Island, wintering party. They were, however, all of them small. The fishing

[1] London 1902.

[2] After communications from Mr. K. A. ANDERSSON.

usually took place in a depth from 8 to 20 m. The bottom was stony with a rich growth of algæ. The temperature at the surface under the ice was constantly — 1,9° C. to — 2° C. The hooks were partly baited with raw meat of penguins or seals, sometimes also with pieces of fish, partly the hooks were not baited at all, but a fish rudely made of a mixture of tin from spoons and lead from gun-balls served to allure the prey. The latter method with "pilk", as it is called in the Scandinavian tongue, often proved to be more successful than with baited hooks. About five species of fish were caught this way. Two of them belonged, as far as could be judged, to the genus *Trematomus*. Probably one of these with the lower jaw projecting was *T. newnesi*. These were most numerous. Next to them in number was a *Notothenia*, most probably *N. mizops* to judge from its long ventrals and general appearance. *Notothenia larseni* was also recognized, perhaps *N. nicolai* as well. There was no opportunity to save and preserve any specimens, but the above statements are based on Mr. K. A. ANDERSSON's recollections when he later, together with the present author, reviewed the ichthyological material of the expedition. No *Chænichthys* or similar fish was caught by this kind of fishing.

The ventricles of the fishes which were caught contained mostly amphipods, which were abundantly represented among the algæ at the fishing-places, but also small fishes.

Although these notes, for natural reasons, cannot be very detailed, they are of value as they give an approximate idea about the numerosity of the fishes in this cold and ice-covered sea. They prove also that the fishes of this region do not make any migrations to evade the snow- and ice-covered, and consequently dark, area, but remain there during the winter, finding plentiful food, and themselves rendering the existence of fish-eating seals possible.

The fishes of Bransfield Strait.

In the last third of November the Expedition had been able to make its way to Bransfield Strait. Under comparatively favorable circumstances the exploration of this highly interesting region was begun, and continued for a couple of weeks. The zoologist had the opportunity to gather from the bottom of this the coldest of all hitherto known marine basins a rich harvest. A hard fate did not, however, allow him to bring this home; and therefore, with the exception of two coloured sketches made by Mr. SKOTTSBERG, nothing of the ichthyological material but a few notes remain, which only prove, that fishes were found at no less than 10 different stations and sometimes in rather great number. These notes may therefore be quoted here with some short remarks.

Stat. 78, NW. of Snow Island, South Shetlands, depth 110 m., sand somewhat mixe with clay, temperature at the bottom — 1,40° C. 23d of Nov. 1902. Some fishes, one painted by SKOTTSBERG.

This sketch is reproduced on Pl. II fig. 6 and represents *Notothenia larseni.*

Stat. 79 near Deception Island.

"Some small fishes."

Stat. 80 at Deception Island, depth 5—10 m.

"A rather large fish, *Notothenia?*" (or *Trematomus?*).

Stat. 81, Bransfield Strait, depth 849 m., clay with some few small stones, temperature — 1.55° C. 25th of Nov. 1902.

"Three species of fish, a *Chænichthys*-, and a *Lycodes*-like fish."

The "*Chænichthys*" might perhaps have been *Ch. rhinoceratus*, as this species has been found by this Expedition at Snowhill. What the "Lycodes-like" one represented is impossible to say, but probably it was something hitherto unknown. The third species was *Artedidraco skottsbergi* (conf. above p. 48), a sketch of which is reproduced on Pl. II fig. 7.

Stat. 82 at Astrolabe Island, depth 40 m., stones.

"1 small fish."

Stat. 87, Gerlache Channel, at Cape Murray, depth 174 m., sand and clay mixed, temperature — 0,10° C.

"Numerous fishes of several species."

Stat. 88, Gerlache Channel, W. from Trinity Island, depth 290 m., clay mixed with sand, temperature — 1,05° C.

"A couple of species of fish."

Stat. 90, Gerlache Channel, SSW. of Pendleton Island, depth 719 m., clay, temperature — 1,65° C.

"A large fish (*Chænichthys*) and a *Lycodes*-like one."

Stat. 93, Bransfield Strait, depth 625 m., and mixed with stones, temperature — 1,0° C.

"Two fishes, a *Macrurus* and a *Lycodes*-like."

Stat. 95, at Astrolabe Island, Bransfield Strait, depth 95 m., clay mixed with sand and stones with algæ.

"Two species of fish."

It is greatly to be deplored that these collections do not exist any more. The only conclusions that can be drawn from these notes are, although incomplete, of great interest. Firstly we receive proofs that several species of fish live normally under such extraordinary physical conditions as those offered in Bransfield Strait, viz. a temperature of more than 1½ degree below ± 0° C., and that they apparently occur plentifully. Secondly it becomes known that the family *Noto-*

theniidæ is best represented. Although only two species (*Notothenia larseni* and *Artedidrace skottsbergi*) with full certainty have been stated, it seems probable thaf some other small species likewise occur, and in addition to them, at least one species of a large "*Notothenia*", or perhaps more probable *Trematomus*, and a "*Chænichthys*". If this latter has not been *Ch. rhinoceratus*, against which the great depth at stations 81 and 90 speaks, it might have been a *Gerlachea* DOLLO which genus was discovered by the "Belgica"-Expedition at a locality not so very distant, or some of the other specialised and "pickerel-shaped" *Nototheniidæ*. But this family is not the only one represented in this region. There was also found a *Macrurus* and a rather large member of *Lycodidæ*, which latter, most probably, is yet undescribed. Such a conclusion is at least near at hand, if the comparison is extended to the species of the genus *Lycodes* of the Northern Atlantic and Arctic Ocean,[1] which appear to have a rather limited distribution.

The propagation of the Nototheniidæ.

Although the following notes are very incomplete they are of interest as they give some information about an almost unknown chapter of the life-history of the subantarctic and antarctic shore-fishes.

A female of *Notothenia brevipes* with a total length of about 12 cm. and caught in Berkeley Sound the 10th of Aug. 1902 in a depth of 25 m. had greatly extended ovaries which seemed almost ripe. The time of propagation of this species could therefore not be very remote. The diameter of the eggs was about 1 mm.[2] A month earlier females of the same species caught at Port Williams the 4th of July had immature ova with a diameter of $^1/_2$—$^3/_4$ mm. This species appears therefore to spawn in the later part of the winter, or early in the beginning of the antarctic spring.

A female of *Notothenia mizops nudifrons* caught at Shag Rocks, W. of South Georgia in a depth of 160 m. the 19th of April 1902 was so greatly distended by the ovaries that the spawning season must have been very near. Its eggs measured about $1^2/_3$ mm. in diameter. The spawning of this species thus probably takes place in the antarctic autumn, which is corroborated by the fact that the specimens of the same kind which were caught at South Georgia a few weeks later had not distended ovaries.

Notothenia larseni has probably a similar spawning time as *N. mizops*, because a female specimen of the former caught at Shag Rocks together with the just mentioned female *N. mizops* had also distended ovaries, and its eggs measured about 1 mm. in diameter.

[1] Conf. the work by AD. JENSEN on the Genus *Lycodes:* "De Nordevropæisk-Grönlandske *Lycodinæ*". Den Danske Ingolf-Expedition. Bd. 2 No. 4. Kjöbenhavn 1904.

[2] These and the following measurements refer to ovarian eggs in preserved state.

Specimens of *Notothenia macrocephala marmorata* caught in May 1902 in Cumberland Bay, South Georgia, showed genital organs beginning to develop, and indicating a spawning season at the end of the antarctic winter, or in the spring.[1] In the large specimens of *N. gibberifrons* caught at the same time the swelling of the genital organs had not yet begun. This species consequently propagates at another time of the year. Specimens of *N. sima* measuring 6—7 cm. in length and caught at Port Louis, Falklands, from July to the middle of August 1902 had distended ovaries and eggs measuring between $^1/_2$ and $^3/_4$ mm. in diameter. This indicates that their spawning takes place in winter or early in the antarctic spring. In *N. coriiceps* caught at the same coast in the same month, the ovaries were at their seasonal minimum of development, which indicates quite another spawning season[2] and at the same time that these two last species are not only structurally but also biologically different, in spite of what has been said to the contrary.

Specimens of *Trematomus hansoni georgianus* caught in Cumberland Bay, South Georgia, had the ovaries only little developed and eggs measuring about $^2/_3$ or $^3/_4$ mm. It seems therefore probable that their spawning season should come at the end of the antarctic winter or early spring.

Among the specimens of *Champsocephalus gunnari* caught in the middle of May 1902 in a depth of about 100 m., at least one female had the ovaries so greatly extended that the spawning must be quite near at hand. The eggs of this specimen lie in the preserved state so pressed together that their diameter cannot be stated quite exactly, but, judging from the fact that some measure 3 mm. or a little more, others fully 4 mm., it may be supposed that the ripe eggs when ready to be extruded have a diameter of at least 4 mm. and become still larger when they have imbibed water. It is not probable that eggs of this great size could be pelagic, nor the larvæ developed from them. Other specimens of *Champsocephalus gunnari* appeared to be just spent, and in the intestinal canal of *Notothenia gibberifrons* were found eggs that seemed to have belonged to this species. The latter fact also proves that the eggs in question are demersal as *N. gibberifrons* certainly is a bottom fish.

A female of *Artedidraco mirus* caught the 14th of May 1902 in Cumberland Bay had distended but not yet quite ripe ovaries indicating a spawning season about the middle of the antarctic winter, or perhaps a little earlier. The eggs were already $2^1/_2$ mm. in diameter but may become 3 mm. or more, and are thus without doubt demersal.

[1] SMITT has recorded about *N. macrocephala* from Punta Arenas that the ovaries were "commençant à renfler" in July. (Poiss. de l'expédition scient. à la Terre de Feu. I. Nototheniæ. Bih. K. Vet. Akad. Handl. Bd. 23. Stockholm 1897.)

[2] SMITT says about this species (l. c.) "déjà en décembre mais plus encore au mois de mai les œufs sont murs, c'est-à-dire que sa propagation se fait probablement depuis l'été jusqu'à l'automne".

A few conclusions may be drawn from these facts recorded above. It is evident that the members of the family *Nototheniidæ* do not spawn all at the same time of the year and this is not even the case with the members of the genus *Notothenia* itself. Some of the latter seem to spawn in the antarctic spring or, perhaps, already in the later part of the winter (*N. sima*, *brevipes*, *macrocephala*, and *m. marmorata*), others in the antarctic autumn or beginning of the winter (*N. mizops nudifrons*, and *larseni*). A third category which in the winter shows genital organs in a minimum of development (as for instance *N. coriiceps* and *gibberifrons*) most probably spawn in the summer. *Trematomus hansoni georgianus* seems to belong to the same category as the first group of Notothenias. The same and all the species of *Notothenia*, in which the present author has found ovaries in an advanced state of development appear to have comparatively small eggs, about 1 to 1½ mm., in the ovary. The more specialised members of the family, on the other hand, as *Artedidraco mirus* and *Chænichthys gunnari* have larger eggs, 2½—4 mm. Thus, the more primitive species have smaller, the more specialised larger eggs. It is only a product of a consequent development in the same direction when finally the highly specialised deep sea fish *Racovitzaia* has acquired a "poche incubatrice" as DOLLO recently has described in his interesting memoir repeatedly quoted. That the eggs when large are demersal, and not pelagic is certain, but whether the small eggs of the more generalised types (*Notothenia*, *Trematomus*) are demersal or not, cannot theoretically be fully decided on the base of the relationship as the experience has taught us that of two nearly allied fishes the one may have pelagic (f. i. *Clupea sprattus*) and the other demersal eggs (f. i. *C. harengus*). The size of the eggs cannot with certainty help us to decide this question, when the diameter is less than 1½ mm., although it appears probable that eggs which have attained that size already in the ovary may be demersal. There are, however, other circumstances which speak more strongly for the demersal nature of the eggs of *Notothenia* and *Trematomus*, viz. the variable spawning time compared with the climatic conditions. The variable spawning time seems to indicate that one time of the year should be as favourable as the other for the development of eggs. This might, within certain limits, be true for demersal eggs on the bottom of the sea, but not for pelagic eggs within the true Antarctic region, where the sea, to a great extent, during the winter is covered with thick ice. Therefore, when we have seen that such species as *Notothenia mizops nudifrons*, and *N. larseni*, which also are found within the true Antarctic region, are ready to spawn in the beginning of the antarctic winter, it might, without too great a danger of making a mistake, be concluded that these fishes have demersal eggs. A similar judgement may also be passed about *Trematomus hansoni* (*georgianus*).

Short notes on the morphology of the digestive system of *Notothenioidæ*.

The shape and arrangement of the intestinal organs is rather similar in all the members of this family examined.

The liver is often large. Its main mass lies to the left, constituting a very large and long lobe, which often as in *Trematomus hansoni georgianus* extends backwards almost to a level with the anal opening. The shape of the liver of this fish is represented in fig. 2 in ventral aspect. The meeian portion often forms one or two short lobes and the right portion is represented by narrow lobe quite anteriorly. This organ seems, however, to be subject to a considerable individual variation as in some specimens of this same fish the viscera were much more broadly covered by the liver than in the one figured. The same organ of other members of this family has about the same shape although the large left lobe does not extend quite so far back, almost two thirds of the distance to the anal opening or more in *Champsocephalus gunnari*, *Notothenia gibberifrons* and *tessellata*, somewhat less still in *Notothenia macrocephala marmorata*, *coriiceps* etc. and *Harpagifer*. In *Parachænichthys* the liver is very large extending two thirds to the anus and the mass corresponding to the left lobe expands also beyond the median line towards the right side.

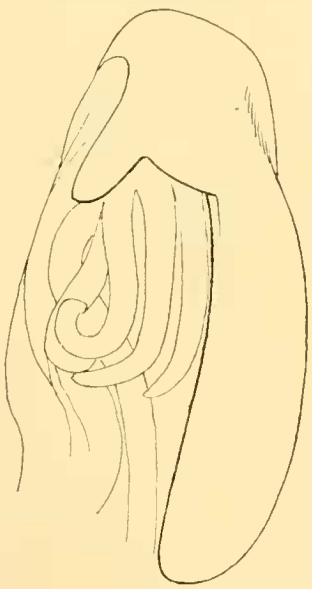

Fig. 2.

The size of the ventricle is considerable and when it is filled with food it has been found to extend all way to the posterior end of the abdominal cavity in several different species belonging to different genera of *Notothenioidæ*. Already this faculty of dilatation indicates that these fishes possess ventricles of the cæcal type, to use OWEN's nomenclature. In *Notothenia gibberifrons* this type is perhaps least differentiated of the species examined in this respect. Its ventricle has when moderately expanded the cardiac and fundus-portivns not much wider than the pylorus-portion. The latter is directed forwards. In other species of *Notothenia* (*tessellata*, *coriieeps*, *macroceph. marmorata*) the general arrangement is the same, but the fundus-portion forms a larger cul de sac. In *Trematomus hansoni georgianus* the pylorus-portion branches of at ringht angle and the cæcal type is thus more differentiated, as fig. 3 shows. In *Champsocephalus gunnari* the fundus-portion forms a still wider and larger cul de

sac which is not rounded, as in *Trematomus*, but conical with the tip directed backwards which indicates a greater specialisation for large prey (fish). The pylorus-portion is short and wide nirected forward with sharp constriction at the pylorus (fig. 4). *Parachænichthys* represents an intermediate stage between the two last mentioned species. It has a very wide fundus-sack which is rounded posteriorly, and a distinct narrowed pylorus-pnrtion which is directed forwards.

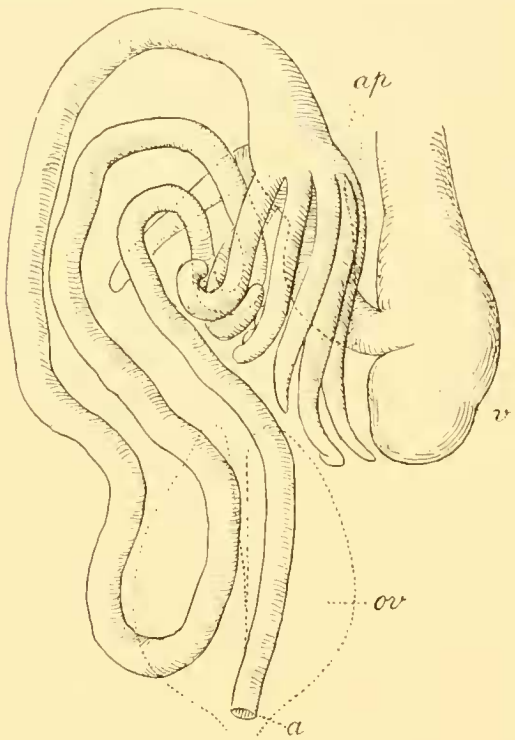

Fig. 3.

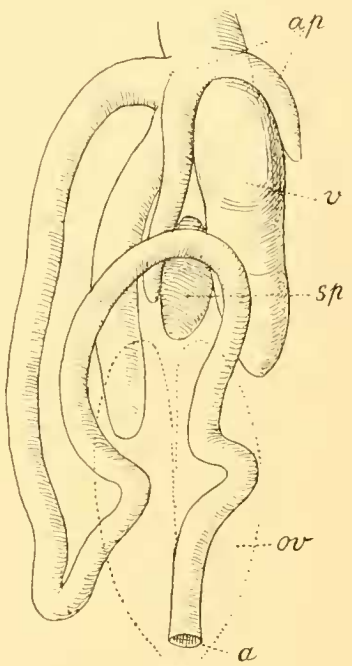

Fig. 4.

The different shape of the ventricles in these fishes stands evidently in connection with the natural condition of their prey.

Notothenia gibberifrons with its small mouth, which has such a direction and shape that it seems suitable to, probably with a kind of sucking motion, collect objects from the sea-bottom, must live on small animals living on or near the ground. Eggs of other fishes with certainty constitute a very important part of its diet, as may be concluded from the fact that in all adult specimens of this species eggs of *Champsocephalus gunnari* were found.

Other species of *Notothenia* live on different kinds of evertebrates. In *N. brevipes* I have found chiefly small crustacea (*Amphipoda* and *Mysidacea*). The same were the contents of the ventricle of *N. mizops* and *N. sima*. The diet of *N. tessel-*

lata is probably similar, but I have also in the ventricle of this species several times found *Polychæta*. In *N. coriiceps* I have found mostly crustacea, even small crabs. *N. macroceph. marmorata* appears to feed to great extent on sea-snails. Especially the large and middle-sized specimens contained in their stomachs the remains of what seemed to have been opistho-branchiate molluses of great size, often so big that one specimen completely filled the whole stomach. That fishes like this one and the foregoing, which live among the vegetation happen to swallow pieces of the same along with their prey which crawled on and among the algæ can be easily understood. I therefore regard the algæ found in the stomachs of these fishes as accidentally engorged. That so really is the case is proved by the fact that the pieces of algæ found in the posterior part of the intestine are just as little digested as those I found in the ventricle.

In the ventricle of *Trematomus hansoni georgianus* I have not found any remains of food material that were recognizable. The specimens of *Champsocephalus gunnari* examined had also empty ventricles, but there cannot prevail any doubt that it preys on fish. A similar conclusion may also be drawn concerning *Parachænichthys georgianus*, but in the latter case it has been distinctly proved by the unmistakable remains of two fishes in the stomach of one specimen of this kind.

The greatest number of pyloric cæca has been found in *Trematomus hansoni georgianus*. In that species they are 7, rather large and long. The same number is also found in some specimens of *Notothenia coriiceps* divided into two groups, one with 3, the other with 4, in other specimens of the same species and from the same locality, however, either group contains only 3, and the whole number is thus only 6. In *N. brevipes* I have counted 6 pyloric appendages, in *N. sima* 6 or 5, in *N. tessellata* 5. In *N. mizops nudifrons* there are 6 such appendages, but some of the middle ones are so reduced in size so that it is very probable that at least one of them in certain instances wholly disappear. *N. macrocephala marmorata* has 5 large pyloric appendages. *N. gibberifrons* has 4 large and wide pyloric cæca. *Champsocephalus gunnari* is provided with only 3 pyloric appendages which, however, are quite large, especially one of them (see fig. 4). The same number is also found in *Parachænichthys* and *Harpagifer*. It may be concluded from this that the more specialised members of the family have been subjected to a reduction with regard to the number of their pyloric appendages.

The arrangement of the intestine is practically the same in all *Nototheniidæ*. In *Trematomus hansoni georgianus* the intestine is comparatively long and runs first from the pyloric region forwards. From a place just behind the small right lobe of the liver it then descends along thn right body wall to the posterior end of the abdominal cavity from where it again curves forward to the pyloric region and then descends to the anus. The whole course of the intestine thus forms a

descending and an ascending loop. but as the intestine is rather long in this species the descending (right) loop shows some undulations and the ascending (median) loop is curved to the left at its anterior end, as is shown on fig. 3. When the intestine is not so long in relation to the abdominal cavity the loops mentioned run almost straight. In some species the regularity is less pronounced. In one specimen of *N. macroc. marmorata*, for instance, the anterior end of the ascending loop is tiqped over to the right, in another it has some undulations on its left side and in a third both loops run quite straight. In *N. gibberifrons* the intestine is large and wide compared with the short abdominal cavity and in consequence of this the ascending loop of the intestine must make a deep bend towards the right so that it is quite doubled up on itself. In *N. mizops nudifrons* both loops are very short and straight. In *Champsocephalus gunnari* the intestine bends backwards immediately from the pyloric tract as may be seen on fig. 4, otherwise it agrees with the Notothenias and so does *Harpagifer*.

Pelagic and benthopelagic fishes.

The Expedition could not afford to spend much time for explorations of the deep sea and it was not especially fitted out for such work. There was, however, some pelagic resp. benthopelagic fishing done and it gave also a comparatively good result. Not counted the larvæ and evolutional stages which have not been worked through as yet, there are 10 species of pelagic fishes in the collection and among them not less than 6 must be regarded as new. Only two of the whole lot are caught so far south viz. S. of lat. 63° S. that they can be regarded as truly antarctic, but one of these, a *Bathylagus*, is among the new species.

1. **Melamphaës (Plectromus) nordenskjöldii** n. sp.

1 specimen from a depth of 2,700 m. caught in an open net. 27th June 1902. 49° 56′ S. lat.; 49° 56′ W. long.

D. III, 9. A. I, 8. Sq. about 30.

Head and body rather thick. Length of head about 3 times in total length without caudal. Greatest depth of body at the occiput contained $3^3/_4$ in total length Depth of body at the dorsal not quite $^9/_{10}$ of the occipital depth. Least depth of caudal peduncle nearly 11 times in total length. Length of caudal peduncle a little shorter than head. Distance from snout to origin of dorsal fin equal to $^3/_4$ of the

distance from the origin of the dorsal fin to the root of the caudal. Diameter of eye $5^1/_5$ times in length of head and 2 times in the interorbital breadth. Length of snout fully $3^1/_2$ times in length of head. Bones of head thin, excavated and fragile. On either side of the parietal region a lamellar crest and above either orbit an oblique crest converging in a forward direction with the continuation of the parietal crest. On the steep anterior surface of the snout a pair of lower lamellar ridges on the median side of either nostril; short similar but longitudinal ridges behind the orbit and in the interspace between the parietal and orbital crests, and also in front and below the orbit, and in the middle of the snout. Some of the ridges seem to be finely crenulated. Opening of the mouth moderate, extending to the vertical through the middle of the eye. Length of the pectoral contained $1^1/_4$ times in length of head. Ventrals short, not reaching vent. Anal spine short and weak. Origin of anal below the last ray of dorsal.

The exact dimensions of the single specimen obtained are as follows:

Total length without caudal	76	mm.
Length of head	26	»
Greatest depth at the occiput	20	»
Depth of body at the origin of the dorsal	18	»
Least depth of caudal peduncle	7	»
Length » » »	24.5	»
Distance from snout to origin of dorsal	33	»
» » origin of dorsal to root of caudal	44	»
Length of pectoral	21	»
Diameter of eye	5	»
Interorbital space	10	»
Length of snout	7	»

The colour in spirit is brownish black with lighter centres to the scales. Branchiostegal membrane deep black.

This new species appears to have a smaller number of dorsal rays than any other of the same genus with which the present author has become acquainted through the, to him, available litterature. From the species with comparatively few dorsal rays it may be distinguished in the following way. *M. robustus* GTHR (D. II, 11), obtained by the "Challenger" in the Mid-Atlantic SW. from Sierra Leone, has much smaller eyes, $^1/_8$ of the length of head, a larger mouth and the origin of the dorsal midway between the snout and the root of the caudal etc. *M. beanii* GTHR (D. II, 11) found in the Atlantic off the coast of the United States has, in addition to the different dorsal, a larger mouth, reaching beyond the eye which also is larger, and the pectoral as long as the head, lat. lin. 25. *M. mizolepis* (GTHR) (D. III, 10), which appears to have a wide distribution as specimens referred to this species have been caught S. of New Guinea off the Arrou Islands by the "Challen-

ger", in the Bay of Bengal by the "Investigator" and in the Pacific off the coast of Colombia and Ecuador by the "Albatross", has a smaller number of scales in a lateral series 18—20, a larger head ($^2/_5$ of total length), smaller eyes, and origin of dorsal midway between snout and root of caudal, etc. *M. maxillaris* GARMAN (III, 10), found off the coast of Ecuador, has a much wider mouth, origin of dorsal behind the middle of the body, etc. Other species of the genus have a larger number of dorsal rays and are thus still more easily distinguished from this one.

The genus *Melamphaës* (including *Plectromus*) appears to be a cosmopolitan genus in the oceanic abysses, and probably many species of the same remain to discover.

2. **Myctophum antarcticum** (GTHR).

Numerous specimens collected floating on the surface. 7th of Febr. 1902. 64° 14′ S. lat. 52° 50′ W. long.

1 specimen taken in an open net, sunk to a depth of 2.800 m. 4th of Febr. 1902. 63° 24′ S. lat. 45° 40′ W. long.

1 specimen taken in the same way as the above mentioned specimen. Depth 2,700 m. 27th of June 1902. 49° 56′ S. lat. 49° 56′ W. long.

About one of the last specimens is written on the label: "brownish black, fins hyaline, luminous organs, iris and opercle bright silvery". The specimens collected floating on the surface are in the best state of preservation and still show the characteristics mentioned. They are also large measuring in average between 8 and 9 cm. without the caudal. This species was first discovered by the "Challenger"-[1] expedition in the Antarctic Ocean where two specimens were captured at the stations 156 and 157. The depth there was resp. 1.975 and 1,950 fathoms, but GÜNTHER assumes that the specimens entered the dredge whilst it was hauled up.

Under the name of *Scopelus colletti* LÜTKEN [2] described a small specimen which according to BRAUER belonged to this species. This one was kept in the Zool. Museum of Kristiania and labelled as having been caught in the Pacific "about 600 miles West from Cape Horn". The authors of "Oceanic Ichthyology" referred *S. colletti* of LÜTKEN to their new genus *Benthosema*, but had no new specimens to record. The "Challenger"-specimens described by GÜNTHER under the name of *S. antarcticus* they seemed inclined to refer to the genus *Rhinoscopelus* (l. c. p. 512). Finally BRAUER [3] stated the identity.

[1] Zoology: Vol. XXII. GÜNTHER, Deep-sea Fishes, p. 197.
[2] Spolia Atlantica: Scopelini. K. D. Vidensk. Selsk. Skrifter. 6 Række, T. VII. Kjöbenhavn 1892.
[3] Zool. Anzeiger Bd. XXVIII N:o 10. "Die Gattung *Myctophum*."

Although this species from the beginning was found in the Antarctic Ocean it was very far from the present locality viz. on resp. 95° 44′ E. long. and 108° 35′ E. long., thus almost on the opposite side in the Australian quadrant. When it now has been found to be numerous in the Atlantic quadrant, and a single find also is recorded from the Pacific quadrant it is by all this made most probable that *M. antarcticum* is a circumpolar species.

3. **Myctophum anderssoni**[1] n. sp.

2 specimens from 2,700 m. depth. 27th June 1902. 49° 56′ S. lat. 49° 56′ W. long.
1 specimen from the same locality but laid in a separate glass.

D. 10—11. A. 18.

This species belongs to the same group as *M. antarcticum*, *arcticum* and *rissoi* according to AUG. BRAUER's arrangement,[2] which is followed here, and his system for signifying the luminous organs is also accepted.

Length of head in the largest specimen 3¾ times, in the smallest 4 times in total length without caudal. Greatest depth of body in the largest about 5, in the smallest 4⅙ times in total length. Diameter of eye about 3 times in head. Length of snout in the largest about 5 times in head. Interorbital width about 8 times in head. Posterior end of maxillary broadened and reaching somewhat beyond the vertical through the posterior margin of the eye. The lens of the eye has a normal central position. The distribution of the luminous organs is as follows (with BRAUER's terms): No luminous organ above the lateral line. PO. 5 in a horizontal series; VO. 4; no Pol.; AO. in one specimen 14, in two others 15, but the two foremost of these are situated a little higher up on the side than the others. Prc. 2, on the same level. PLO. and both PVO. sit in the same almost horizontal row below the level of the base of the pectoral (the PLO. sits rather close to the anterior PVO.) VLO. above and a little behind the base of the ventrals. The SAO. are unfortunately lost).

The fact that the two foremost SO. are lifted up above the following series separates this species from its three nearest relatives quoted above. Fom *M. antarcticum* and *M. rissoi* with resp. 16—19 and 10—12 AO. it is distinct by having 14—15 AO. From *M. arcticum* it is distinct by the normally placed central lens, which organ in *M. arcticum* is moved dorsad so that it is excentric in the eye. The arrangement of PLO. and PVO. is also characteristic.

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[1] Named for the Zoologist of the Expedition Mr. K. A. ANDERSSON.
[2] Vide Zool. Anzeiger Bd. XXVIII N:o 10: "Die Gattung *Myctophum*."

The largest specimen measured 60 mm., the smallest 22 mm. in length without the caudal which is rather large and cleft fully to the middle or beyond.

Length of head	resp.	16 and	7 mm.
Depth of body	»	12.5 »	5.3 »
Diameter of eye	»	5,5 »	2,3 »
Length of snout	»	.3 »	1,3 »

The specimens are in no good condition but the characteristics described above appear to be sufficient to prove the distinctness of this species.

4. **Myctophum parallelum** n. sp.

One specimen from a depth of 2,500 m. 23 June 1902. 48° 27′ S. lat. 42° 36′ W. long.

D. 9. A. (probably) 21.

Length of head almost 4 times in total length without caudal. Greatest depth of body fully 4 times in total length. Diameter of eye about $2^{1}/_{5}$ times in length of head, snout half as long as eye, $4^{2}/_{5}$ times in length of head. Interorbital space very narrow, about $^{1}/_{10}$ of the diameter of eye. The lens of the eye excentric moved in a dorsal direction (which BRAUER regards as the first beginning of forming a telescope eye). The posterior end of the maxillary is very broad and extends beyond the vertical through the posterior margin of the eye. Origin of the dorsal a good deal behind the vertical through the base of the ventrals. The luminous organs arranged as follows (with BRAUER's terms). PLO. below the level of the base of the pectoral near the anterior PVO., the other PVO. at the base of the pectoral. VLO. almost vertically above the base of the ventrals. The SAO. do not sit in a straight series because the hindmost one is placed a little higher than the others. The distance between the anterior and middle SAO. is also greater than that between the middle and posterior, which appears to be a difference from the condition found in *M. arcticum*. PVO. and VLO. as in *M. arcticum*. AO. 18 in a continuous series. The Prc. sit further apart than in *M. arcticum*. Two great luminous spots below the caudal peduncle nearer to the caudal than to the anal fin.

The dimensions of the single female specimen are as follows:

Total length without caudal	42 mm.
Depth of body	10,3 »
Distance from snout to dorsal fin	21,5
» » » ventral	16 »
Length of head	11
Diameter of eye	5
Length of snout	2,5
Interorbital width	0,5

This species is closely allied to *Myctophum arcticum* (LÜTKEN)[1] described from off the Greenland coast, but differs from the same in the following point. The number of anal rays is large, about 21, but only 17 in *M. arcticum*. AO. are 18 in this new species, only 15—16 in *M. arcticum*, and as already stated the Prc. sit farther apart. The different arrangement of the SAO. is already mentioned. I have not had any specimen of *M. arcticum* for comparison, but, to judge from LÜTKEN's figure (l. c. p. 249), it seems to have a considerably wider interorbital space than the new species. The relative dimensions of the head are also different. In a specimen measured by LÜTKEN, and of the same size as this one, the length of the head was contained $3^1/_5$ times in the total length, and according to a communication, kindly given me in a letter by my friend Professor AUG. BRAUER, he has found the relation between the length of the head and the total length in another specimen of *M. arcticum* to be $1 : 3{,}3$. These differences appear to be so important that, if the different geographical distribution as well is put in the scales, there can be no doubt of the specific value of the fish described above. But it is of exceedingly great interest to find that the Greenland seas and the Southern Atlantic are inhabited by two so closely related forms which even show a such biological affinity as the excentric situation of the lens of the eye indicates.

5. **Myctophum affine** (LÜTKEN).

1 specimen caught at the surface where the temperature was + 21,9° C. 11th of Dec. 1901. 32° 15′ S. lat. 50° 14′ W. long.

The collection of this expedition contains only a single and small specimen of this species from the mentioned locality. But it is otherwise known to be very widely distributed as already LÜTKEN[2] could enumerate many localities from the Indian Ocean. Later the authors of the "Oceanic Ichthyology" could record their *M. opalinum* from many other localities in the Northern Atlantic off the North American coast. *M. nitidulum* GARMAN is very similar to this one and, if not identical, it seems to be only a geographic subspecies of *M. affine* found in the Pacific: 27° 50′ N. lat., 145° 45′ 30″ W.

The above recorded locality appears to be the most south-western where this species has been hitherto collected.

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[1] Spolia Atlantica. Scopelini. K. D. Vidensk. Selsk. Skr. 6 Række T. VII. Kjöbenhavn 1892.
[2] Spolia Atlantica l. c. p. 252.

6. **Myctophum (Lampanyctus) braueri** n. sp.

Fig. 1 p. 61.

1 specimen caught in a net drawn from a depth of 2,700 m. to the surface, 49° 56′ S. lat., 49° 56′ W. long. 27th of June 1902.

D. 15. A. 18.

Body rather slender, depth of body about 7 times in total length without caudal. Head large, only $3^1/_2$ times in total length. Diameter of eye about $4^1/_2$ times in length of head. Snout damaged, a little shorter than diameter of eye. Mouth wide extending far beyond posterior margin of eye. Origin of dorsal somewhat behind base of ventrals. Ventrals reaching beyond origin of anal. Posterior end of anal opposite to the adipose fin.

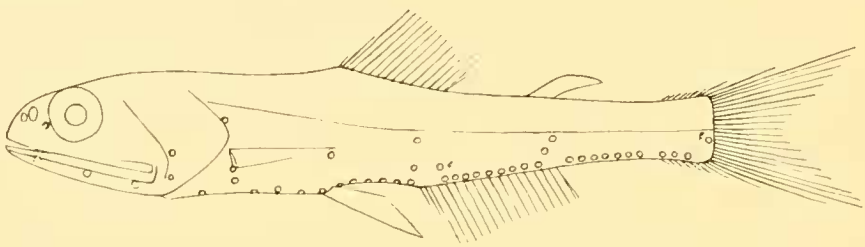


Fig. 1.

As the specimen is somewhat damaged it is difficult in some cases to state the exact position of the luminous organs. The following statements may, however, be correct: An antorbital, three branchiostegal, and four opercular luminous organs, as usual. A large gap between the first and the four following PO. The two PVO. vertically above each other, below the base of the pectoral. The PLO. above and in front of the same, not far from the lateral line. Six VO. in a series. The most posterior of these is, however, the lowest SAO., as the two others of this group sit in a vertical row above the same. A VLO. sits straight above the base of the ventral but somewhat nearer the lateral line than the ventral. The foremost AO. is pushed somewhat upwards from the otherwise continuous series consisting of nine more AO. along the base of the anal fin. At the posterior end of this series two Pol. form a diagonal series upwards and backwards from the last of the nine AO. Behind a gap seven more AO. form a series along the lower margin of the caudal peduncle and then after a gap three Pcr. sit in a ventral series. Where the fourth Pcr. has been situated cannot be decided as it is lost on both sides.

To judge from BRAUER's descriptions this new species may be most nearly related to *M.* (*Lampanyctus*) *maderense* (LOWE) and *warmingi* LÜTKEN. *M. braueri*

differs, however, from both through the low situation of the lower SAO. and by the larger number of AO., (10) 9 + 7, while the same series counts in the former of the two others 5 — 6 + (6 — 7) and in the latter (5 — 6) + 5. *M. braueri* has also a greater number of anal rays viz. about 18 compared with resp. 13—14 and 13 in the others. *M. maderense* has also a frontal horn on either side, directed forward from the upper rim of the orbit. The name of this species indicates where it was first found, but LÜTKEN has also recorded it from the Westman Islands, celand. *M. warmingi* was described from a specimen caught in the Atlantic 32° 6′ N. lat., 39° 28′ W. long.

7. **Cyclothone microdon** (GÜNTHER).

1 specimen in a net drawn from a depth of 2,000 m. to the surface, the actual depth being 2,622 m. and the temperature at the bottom + 1,32° C. 17th of June 1902. 52° 39′ S. lat. 37° 35′ W. long.

Numerous specimens from a depth of 2,500 m. 23 June 1902. 48° 27′ S. lat. 42° 36′ W. long.

Numerous specimens from a depth of 2,700 m. 27th June 1902. 49° 56′ S. lat. 49 56′ W. long.

This fish seems to be a cosmopolitan as already the "Challenger" expedition collected it at the most various localities.

8. **Astronectes antarcticus** n. sp.

1 specimen from a depth of 2,500 m. 23 June 1902. 48° 27′ S. lat. 42° 36′ W. long,

P. 9. V. 7. D. 11. A. 15.

Length of the head contained about 5 times in total length without caudal, and a little larger than greatest depth of body. Least depth of caudal peduncle contained $3^1/_3$ in greatest depth and $3^7/_{10}$ in length of head. Diameter of eye contained about $5^2/_3$ times in length of head. Snout decidedly longer than eye contained $3^7/_{10}$ times in length of head. No vomerine teeth, a few on the palatine. 11 teeth * in the upper jaw, the second largest of the same size as the foremost mandibular fang. Pectorals not reaching half way to ventrals, and ventrals reaching

* In some instances a loosened tooth is still hanging in the soft tissues although the new tooth is already fully developed.

a little more than half way to vent. Distance from snout to origin of dorsal equal to distance from snout to ventrals. No adipose fin below in front of vent. Dorsal adipose fin beginning opposite tenth anal ray. Barbel a little longer than head, with an unpigmented, somewhat clubshaped, luminous organ at the extreme end. 35 pairs of luminous spots from the anterior part of the isthmus to the ventrals, 16 pairs from the ventrals to the vent and 3 more on either side of the anal, but whether the series is continued still further, cannot be discerned on the present specimen. The latero-ventral row contains probably according to an approximate estimation about 56 luminous spots, but only the 42 anterior ones of those are conspicuous on the present specimen, extending from the opercle to opposite the seventh anal ray. There has also been luminous spots on the head (on the opercle and above the upper jaw), but nothing can be said about them. Skin black with small white spots.

Dimensions:

Total length without caudal	188 mm.
Length of head	37 »
Greatest depth of body	33 »
Depth of body at beginning of dorsal	29 »
Least depth of caudal peduncle	10 »
Distance from snout to dorsal fin	100 »
» » » » ventrals	100 »
» » beginning of dorsal to root of caudal	87 »
» » » » anal » » » »	42 »
Base of dorsal	18 »
Postorbital length of head	23 »
Diameter of eye	6,5 »
Length of snout	10 »
Length of barbel	42 »

With regard to the number of fin-rays this new species resembles *A. richardsonii* POEY from the Cuban waters but differs from the same through some relative dimensions. *A. antarcticus* is not so slender, so that, for instance, its height at the dorsal is more than the postorbital length ot the head. It has a longer snout which is as may be seen from the measurements above a good deal longer than the diameter of the eye, while it is only two thirds the length of the eye in *A. richardsonii*. The distance from the anal origin to the root of caudal equals in the latter the length of the head, but in the new species the former measurement is longer. *A. niger* RICHARDSON, *A. gemmifer* GOODE & BEAN, *A. barbatus* KNER and *A. indicus* BRAUER have a much larger number of dorsal rays (16—17) and differ also in other respects. *A. boulengeri* GILCHRIST * has 16 dorsal rays and ventral adipose

* Marine Investigations in South Africa Vol. II. Cape Town 1904.

fin. *A. martensii* KLUNZINGER and *A. splendidus* BRAUER have a similar number of dorsal rays but have all of them a ventral adipose fin and the origin of the dorsal is situated behind the origin of the ventrals.

9. **Bathylagus euryops** GOODE & BEAN var. **latifrons** n.

1 specimen from a depth of 2,700 m. 27th June 1902. 49° 56′ S. lat. — 49° 56′ W. long.

D. 9. A. 16. Sq. about 40.

As may be seen from the measurements recorded below, this fish agrees very well with the species, which has been named as above, except in one respect viz. the interorbital breadth which appears to be so much larger in the southern form, that it may deserve to be distinguished by a third name *latifrons* as a geographic variety. The american ichthyologists who in their work "Oceanic Ichthyology" described *B. euryops* said that the width of the interorbital space was "a little more than one half the diameter of the eye". In the present fish, however, the interorbital width measured above the middle of the eye is almost as large as the diameter of the eye and even in front, above the snout, where the interorbital width is narrowest, it is considerably more than "one half the diameter of eye".

Total length without caudal	209	mm.
Length of head	51	»
Depth of body	44	»
Least depth of caudal peduncle	15	»
Distance from snout to dorsal fin	97	»
» » dorsal fin to root of caudal	114	»
» » vent » » »	55	»
Diameter of eye	23	»
Length of snout	12	»
Interorbital width above ths middle of the eye	21	»
» » in front on the snout	15	»

The single specimen has lost its scales, but they seem to have been about 40 in a longitudinal series. It is black and the iris is said to have been yellow with metallic lustre which, no doubt, gave the fish a strange appearance.

The typical *B. euryops* has been caught in the Atlantic off the North American coast at different places about 39° 29′ N. lat. — 40° 9′ N. lat. and 71° 46′ — 67° 9′ W. long. There is thus a difference in latitude of more than 88° between the northern and southern locality and this may be sufficient to explain a racial difference.

10. **Bathylagus gracilis** n. sp.

1 specimen from a depth of 2,800 m. 4th Febr. 1902, 63° 24′ S. lat. 45° 40′ W. long.
1 » » » » 2,700 m. 27th June 1902, 49° 56′ S. lat. 49° 56′ W. long.
both caught in an open net.

D. 9—10. A. 19. Squ. 41 (?) in a longitudinal row, 5 in a vertical between the beginning of dorsal and ventral.

Body long and slender. Length of head contained 4—4½ times in total length without caudal. Greatest depth of body about 7 times in total length. Least depth of body not much more than twice in greatest depth. Beginning of dorsal nearer to snout than to base of caudal fin. Diameter of eye equal to half the length of head. Snout short, not quite half as long as the diameter of eye. Interorbital space very narrow and deeply concave. Mouth small, posterior end of the maxillary not quite on a level with the lower margin of eye.

The dimensions of the two specimens are:

Total length	60	82 mm.
Length of head	15	18 »
Greatest depth of body	8,5	12 »
Least depth of body	4	5 »
Distance from snout to dorsal fin	28	37 »
» » » adipose »	52	68 »
» » » ventral »	29	39 »
» » » anal »	43	57 »
Diameter of eye	7,3	9 »
Length of snout	3,5	4,5 »
Interorbital width	1	2 »

The larger specimen is labelled as having been, when just caught, "greyish brown, with the belly bright bluish green. Paired fins hyaline, dorsal, anal and caudal fins somewhat brownish". The smaller specimen is labelled "dark brown". In general appearance this species is more slender than the two species which are figured in "Oceanic Ichthyology" and the contour of the forehead and snout are somewhat longer than that of the chin. *B. antarcticus* GTHR is described from the Antarctic Ocean * but is readily distinguished from this species by having a greater number of anal rays, 22 instead of 19, a broader interorbital space being two thirds as wide as eye and flat, and a deeper body about which it is said, that it is only "rather less than the length of the head". These differences cannot be due to different size and age as the Challenger specimen is said to be 4½ inches

* Challenger Rep. Vol. XXII p. 220—221 & Ann. Mag. Nat. Hist. 1878 Vol 2.

or 114 mm. long, thus only one third longer than the largest of these two specimens which on the whole agree very well, as may be seen from the measurements above. With regard to the number of rays in the dorsal and anal fin this new species agrees with *B. benedicti* GOODE & BEAN * described, but the former has a larger number of scales in a longitudinal row, about 41, instead of 32 in the latter. But on the other hand *B. benedicti* has (1 or) 2 scales more in a vertical row at the beginning of the dorsal which indicates that it has a greater depth of body which is not far from equal to the length of head. To judge from the figure the least depth of body is contained more than thrice in the greatest depth of body in *B. benedicti*. Other species of the genus have a smaller number of anal rays and are also different in other respects.

* Oceanic Ichthyology p. 55—56 Plate XVII, fig. 64.

Contents.

Stockholm 1905. Kungl. Boktryckeriet.

Explanation of Plates.

Pl. I.

Fig. 1. *Notothenia sima* Richardson from Berkeley Sound, Falklands, depth 16 m, shells and algæ, 19th July 1902.

2. *Notothenia mizops* Günther var. *nudifrons* n. from South Georgia 1902.

3. *Notothenia larseni* n. sp. from Cumberland Bay, South Georgia, depth 252—310 m., grey clay mixed with stones, 5th of June 1902.

4. *Artedidraco mirus* n. g. & sp. from Cumberland Bay, South Georgia, depth 250 m., small stones, May 1902.

» 5. *Phucocotes variegatus* (Günther) from Port Louis, Falklands, among kelp, 30th of July 1902.

Pl. II.

6. *Notothenia larseni* n. sp. from Snowhill, depth 125 m., gravel and stones, 16th of Jan. 1902.

» 7. *Artedidraco skottsbergi* n. g. & sp. from Bransfield Strait, depth 849 m., mud and stones, 25th of Nov. 1902.

» 8. *Genypterus blacodes* (Forster) from Tekenika Bay, Tierra del Fuego, depth 7 m., mud and *Rhodymenia*, 6th of Nov. 1902.

Figures 1—8 painted from living specimens by Mr. Skottsberg.

Pl. III.

» 9. *Notothenia dubia* n. sp. from Cumberland Bay, South Georgia, depth 20 m., 30th of May 1902.

» 10. *Notothenia gibberifrons* n. sp. from Cumberland Bay, South Georgia, depth 75 m., clay and some algæ, 14th of May 1902.

» 11. *Careproctus georgianus* n. sp. from Cumberland Bay, South Georgia, depth 125 m., clay mixed with stones, 29th of May 1902.

b. anterior part seen from below.

c. ventral disk, 5 times enlarged.

d. 3 teeth strongly enlarged.

12. *Liparis antarctica* Putnam n. subsp. (?) *falklandica*, from Berkley Sound, Falklands, depth 16 m., gravel, shells and algæ, 19th of July 1902. Three teeth very strongly enlarged.

Pl. IV.

Fig. 13. *Notothenia karlandreæ* n. sp. from Port Williams, Falklands, depth 12 m., sand and gravel, 3d of Sept. 1902.

» 14. *Artedidraco mirus* n. g. & sp. ♂, from Cumberland Bay, South Georgia, depth 75 m., clay and some algæ, 12th of May 1902.

a. upper view of the head of the same.

b. pectoral arch of the same, enlarged.

c. opercular apparatus of the same, nat. size.

» 15. *Artedidraco skottsbergi* n. g. & sp. from Snow Hill, depth 125 m., stones and gravel, 20th of Jan. 1902.

Pl. V.

» 16. *Notothenia brevicauda* n. sp. from Ushuaia, depth 10 m., 15 of March 1902.

» 17. *Trematomus hansoni* BOULENGER *georgianus* n. subsp. from Cumberland Bay, South Georgia, 22d of May 1902. $^1/_2$ nat. size.

Figures 9—17 are drawn by Mr. A. EKBLOM, and are when not otherwise recorded all in nat. size.

Fig. 1

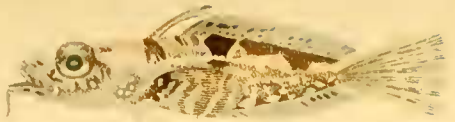


Fig. 4

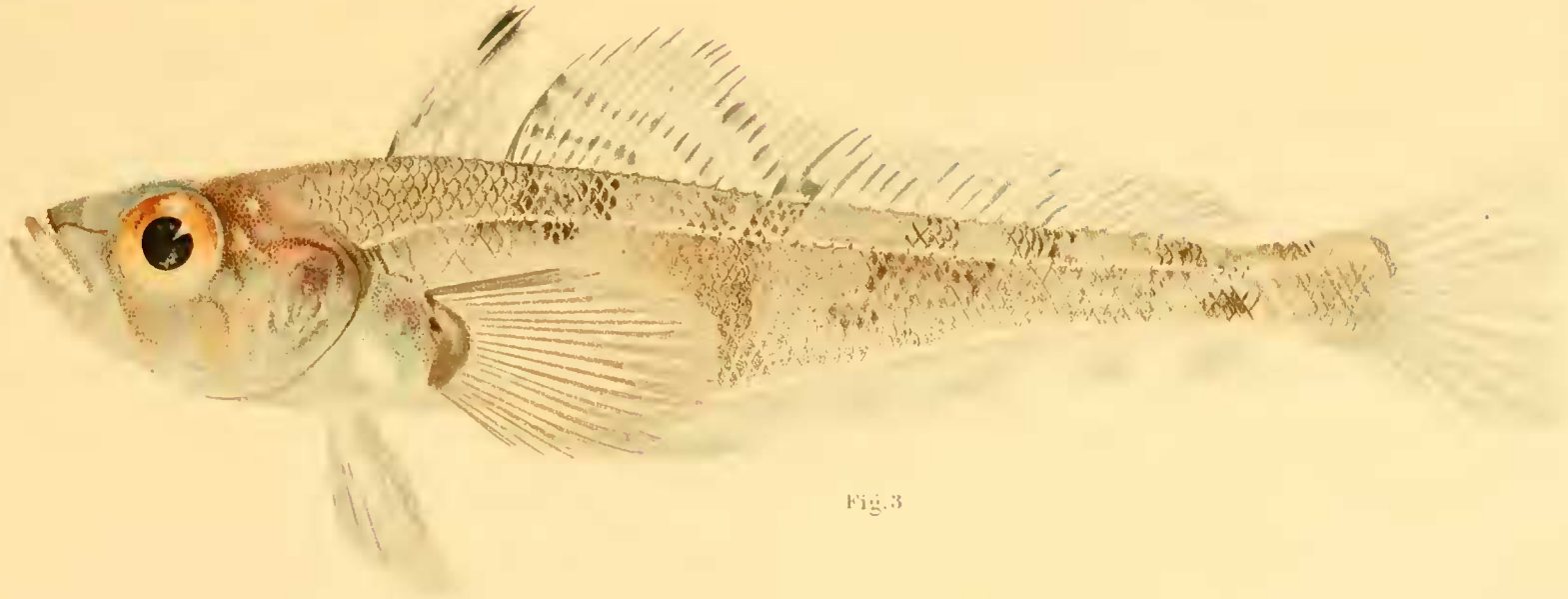


Fig. 3

Fig. 2

Fig. 5

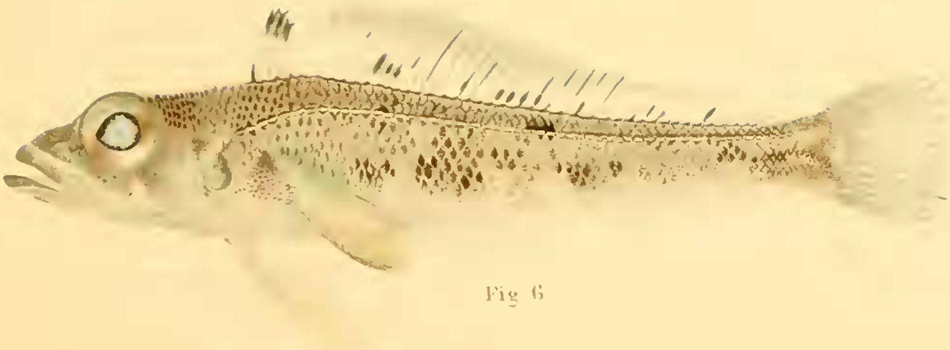


Fig. 6

Fig. 7

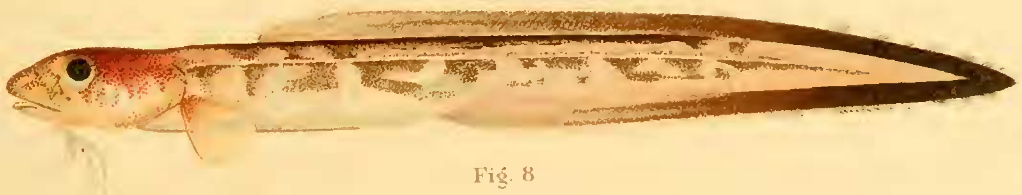
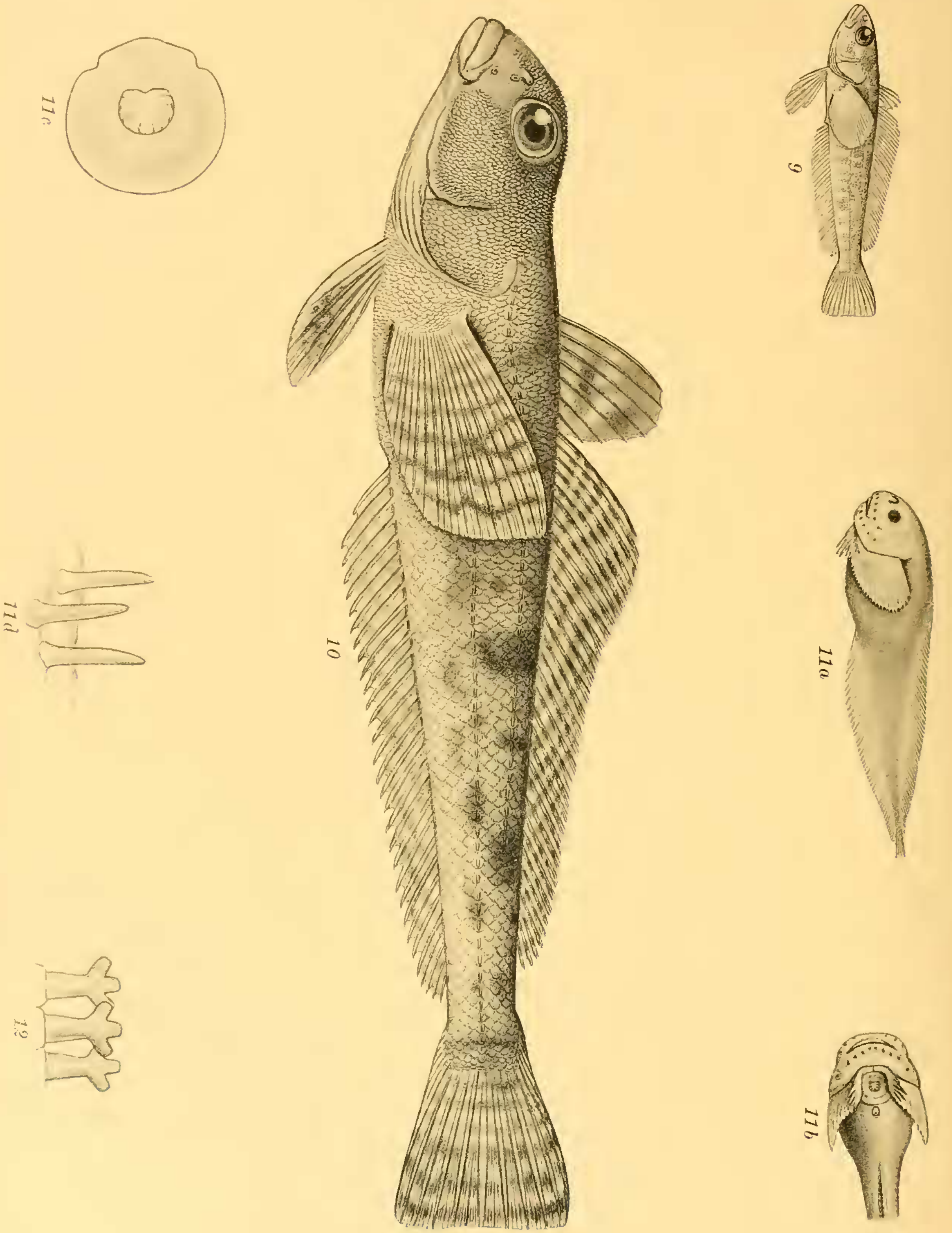


Fig. 8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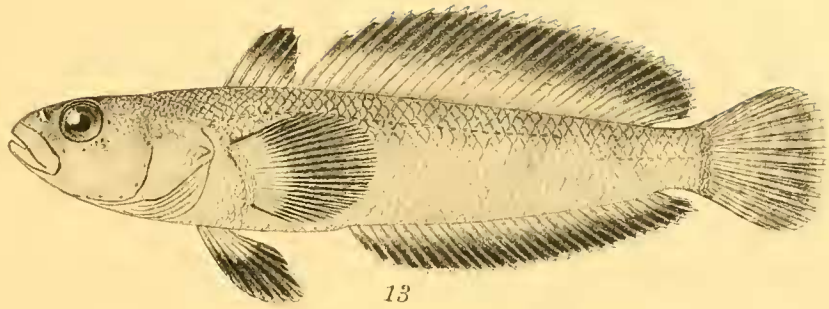

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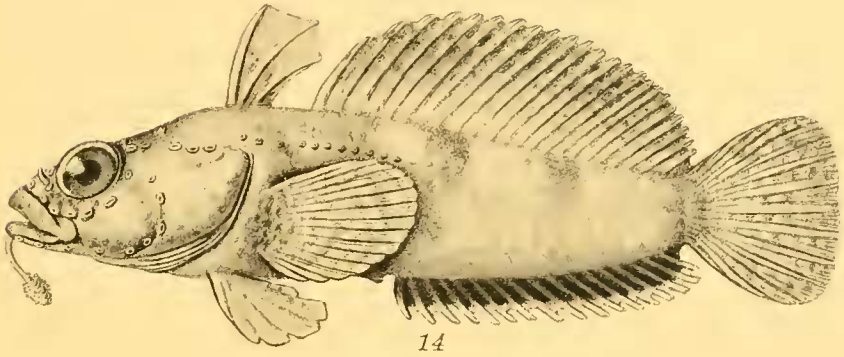
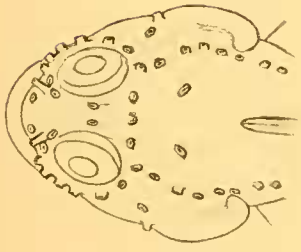


14



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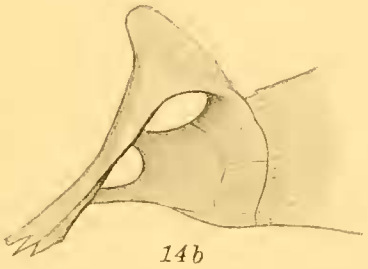
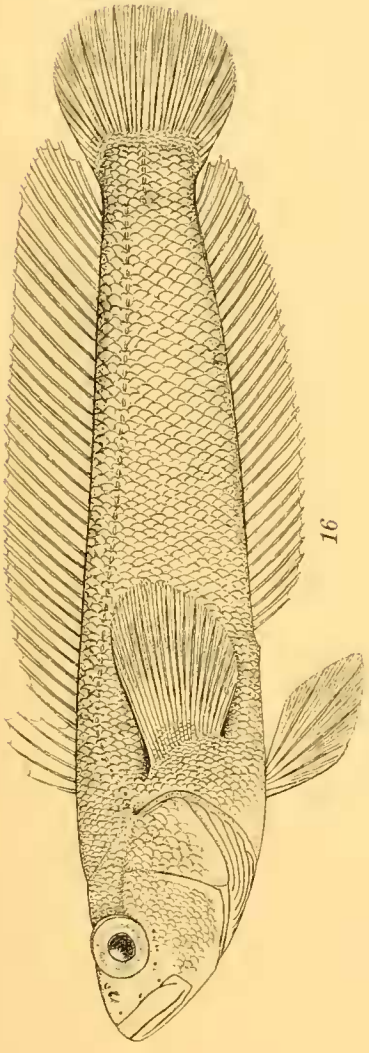


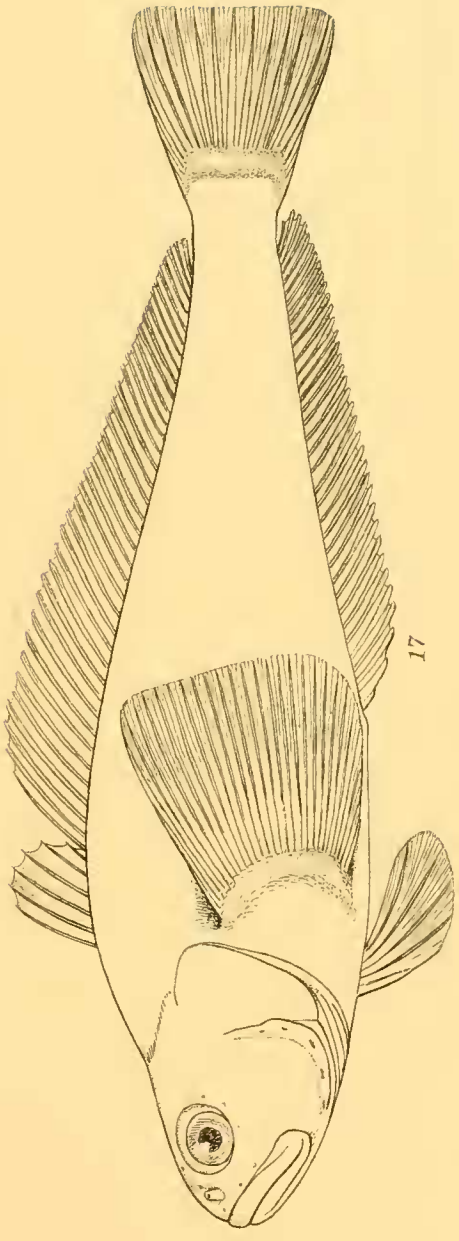
14b

14c

15



16



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